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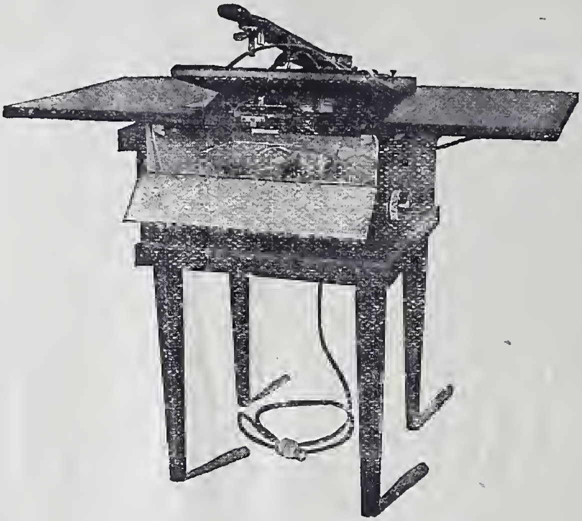

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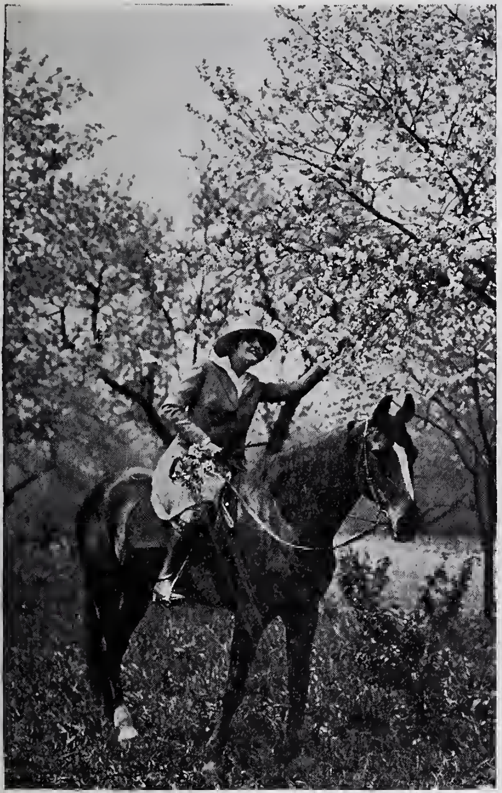

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CONTENTS FOR AUGUST, 1920

Photographic Portraiture . . . . . W. C. E. 293
Expression and Light . . . . . Antony Guest 299
The Permanence of Color Pigments . . . . . Sir William Abney 302
Editor's Table—The National Convention 307
The Studio—Practical Papers on Studio Work and Methods 308
Views and Reviews 315
The Workroom 318

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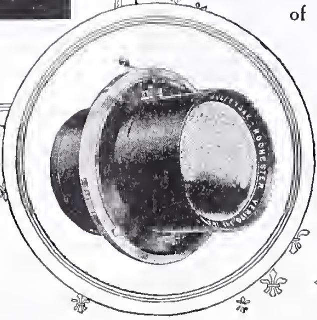

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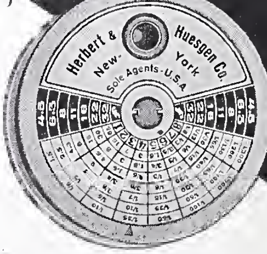

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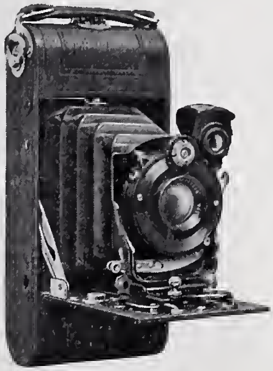

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CONTENTS

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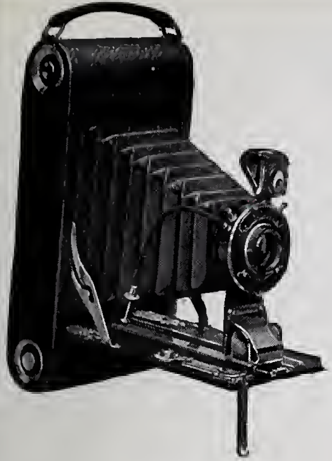

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VOLUME LVII AUGUST, 1920 NUMBER 8

THE AUTHORITY FOR THE PROFESSIONAL PHOTOGRAPHER
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PHOTOGRAPHIC PORTRAITURE

By W. C. E.

I CANNOT recall from actual experience the conditions under which portraiture by the aid of the lens was prosecuted in what appears to us now at times almost remote; the collotype, the daguerreotype, I had no part in. The sitters of those days were doubtless in all essential respects identical with the people who sit to us now, requiring substantially the same attentions at our hands, though not so exacting in their wants and expectations, because the popular taste and education in art advances with the progress of our art itself. What satisfied the general sitter thirty years ago would not find any favor now, just as the long sittings required in early times would not be tolerated now, for the state of the case is well known, and something like an exposure of a few seconds, more or less, is looked for as a matter of course. The word "instantaneous" has come to be associated with all photographic operations.

In portraiture a succession of phases has been passed through, looked at from a professional point of view. One who has stood beside the camera for a number of years can call to mind distinct features belonging to successive periods. These may apply to pose in some instances, and in others to accessories, and so forth. At certain dates we can speak of this or that style being "in fashion." There was, for example, the plain background, then the pillar and curtain, then the picture era, the introduction of the solid accessory, and the time when every one who stood for a portrait was made to lean on the back of a chair. Of course, there were always those who had perceptions of the fitness of things superior to the common tendency of the time, and stood out as the stars of the profession, and no doubt it will always be the same. We live in a time which will take its place in photographic history, and have its characteristics pointed to in turn. It is well, however, if we can rise above our environments so far as to be able to know what is merely temporary and what is enduring in the principles which guide us in our art and practice. For the beautiful is everlasting and can be admired and enjoyed at any time, even long after it may have been discarded for some new form or method of producing an effect.

As the painter must ever be beholden to his brush and other mechanical aids to the expression of his genius, so must the photographer make intelligent use of his appliances in order to the production of his best efforts. As portraits may be painted or produced by other means than those usually employed, so may photographic portraits be produced without a studio; but to the professional man the studio is as necessary in the one case as the other. Amid all changes certain requirements remain, and the studio is one of these. Let me say a word about it: All manner of construction and situation is to be found, and probably advocates for every variety we can think of; but while many are compelled to do with less than they could wish, or a different situation than they could desire, a very general inclination will be found in favor of a north light. My own preference is decidedly toward a north or northeast aspect. My studio is seven feet six inches in height at the side, arising from that at an angle of forty-five degrees. This I consider a good serviceable height. It will be found that a high roof lessens the effective control of light by the operator, without which just so much more difficult and uncertain will it be to obtain the most satisfactory results.

The construction of a studio, apart from its relation to the principal light, has not, I think, very much effect one way or the other on the work produced in it, unless it is of a most awkward and inconvenient description. It must be a very faulty studio indeed in which good work cannot be done, provided there be on the part of the operator the necessary knowledge of the requirements of any particular case, and how to meet them by skilful adjustments, and what I might call artistic tact.

In the matter of lighting the subject, one man's work is apt to partake of a certain uniformity of character, arising from his constantly working under the same, or nearly the same, conditions. A very common error many operators fall into is to set every sitter on the same spot and endeavor to direct the light they judge most suitable on that spot, instead of trying the effect of different points, where they may be placed in relation to the main light—in fact, bringing "the mountain" to Mahomet, instead of Mahomet to the mountain. Where the facilities for doing this are very limited, or where it cannot be done at all, there is no more to be said, and the best must be done with what is available.

Where we have to deal with strong contrasts, such as white hair and high complexion, or white and black draperies, the subject will be most effectively treated by being made to face the light; where the conditions are reversed, an opposite treatment, according to the particular demands of the case, must be resorted to. The matter can only be referred to in general terms. A skillful operator will determine what to do when the subject comes into his hands, and especially when he sees the sitter in the light which falls just about where he is to be taken.

If good lighting necessitates considerable study and knowledge of effects, posing demands no less; indeed, the art of lighting a subject may be mastered with tolerable completeness, while posing may never be thoroughly acquired, because it is less of a mechanical accomplishment. It calls for a knowledge of harmony of lines, and the effect of balancing of parts—what, in short, is described as composition, and which everyone does not naturally possess. An operator may fail in this, just as painters sometimes do, who, though good colorists, are defective as draughtsmen, and in the ability to conceive a good picture. We sometimes feel that photography is too literal to be artistic. From a client's point of view, its tendency is to exaggerate the imperfections rather than the *perfections* of face and figure. Should you have a stout figure to photograph, the neck, as a rule, will appear short. To obviate this appearance in the portrait, it is best to adopt a standing pose, with the camera a little below the level of the head. If a sitting position is chosen, undue height will be given to the shoulders, and the shortness of neck will be emphasized. In treating the opposite extreme—a thin figure with sloping shoulders (not so objectionable in the gentle as in the sterner sex)—I recommend a sitting pose, and in the case of gentlemen, especially when the head is large, a little drapery, in the form of an overcoat loosely thrown back. The head should be turned in the reverse direction from the angle at which the body is placed, which will help to give the appearance of substance and harmony to the figure, and altogether make the picture more pleasing. A little attention of this sort will improve defects in the sitter just as easily as the want of it may produce them where they ought not to exist. As a rule, twist the figure as little as possible when the person is stout.

No doubt many workers have observed that some people turn the head more gracefully in one direction than in another; the head seems balanced in the one case, while in the other it may be the line of the neck and shoulder forms too great an angle. Should it be necessary to take view of the face which gives prominence to this defect, turn the figure away, and the head toward the camera.

Allow me to say a few words as to the treatment of the different features of the face.

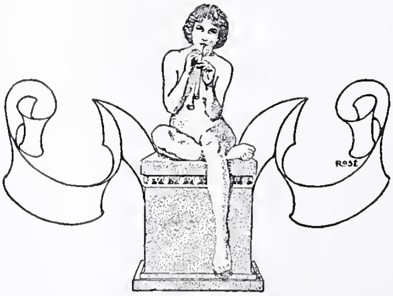
When the forehead is high and broad, no particular attention need be paid to the view taken of it; but should it recede too much, and a side or three-quarters view of the face be wanted, let the outline blend with the background. The same treatment should be resorted to where there is an undue fulness of the upper part; of course, in children this is common and is no defect, but when occurring in the adult it should be modified.

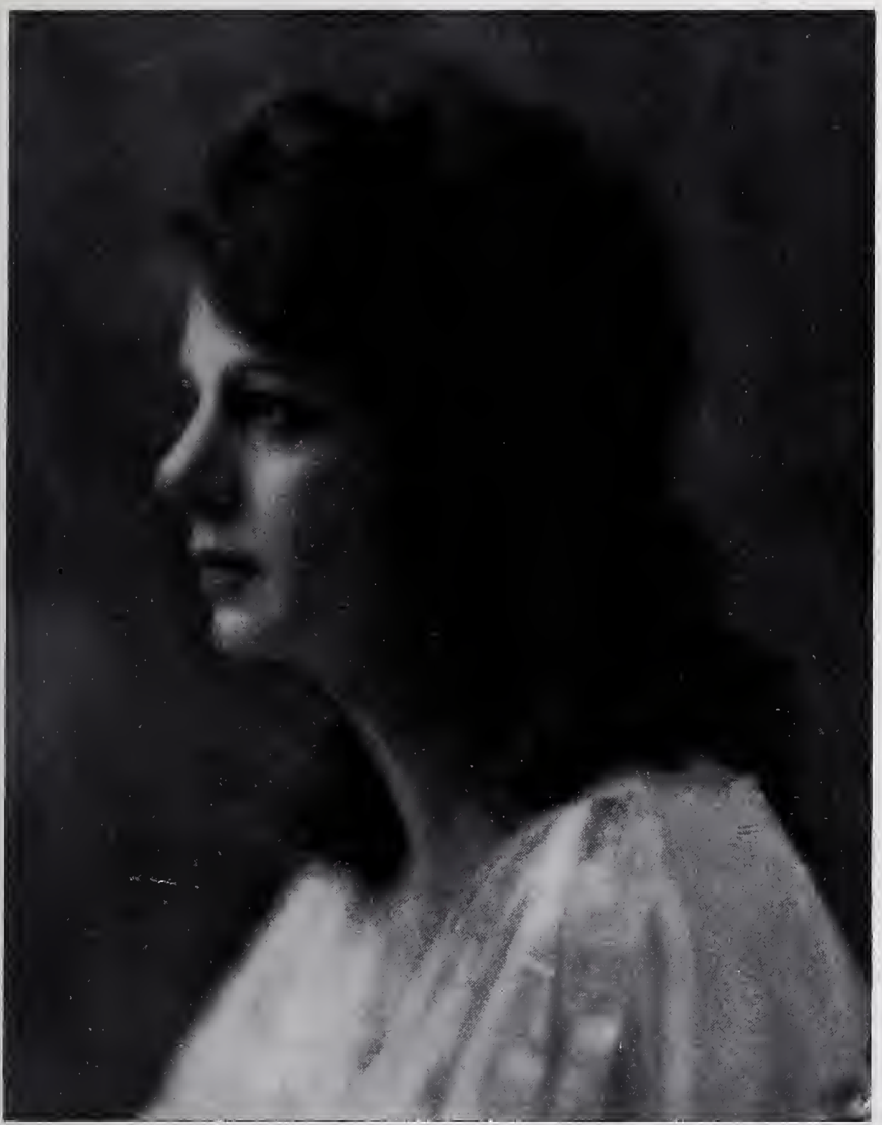
Very often one brow droops a little, or the eyelids may have the same tendency, in which case I find the best plan to avoid exaggerating this inequality, is to turn the figure to that side and the head toward the camera, keeping the droop in the shadow. Variety in noses is endless; make the lens look down at the short and up at the long, or rather place them in these relations to the lens. If the outline be ungraceful, modify it by more front view. A really good or beautiful nose will be valued by its possessor, and its beauty will be best exhibited by a slight turn of the head; a broad nose is improved by the same treatment.

The full eye, when light, is difficult to manage, and if all other conditions are suitable, should be turned away from the light; in fact, the greater portion of the face should be in shadow. When the eye, on the contrary, is dark, avoid reflections which show with marked effect on the eyeball. A sullen eye is generally turned toward the light, but I prefer it turned away, and the light diffused with a medium such as tissue-paper close to the head. As regards the expression of the eye, we must remember that this is an act of the mind and not of the will, and that the old style of request, when being taken, to "Look a little pleasant, please," was wide of the mark, as the endeavor to so do never affected the eye or intellectual part of the expression.

With reference to the mouth, the chief want felt in photographs is lightness and transparency of shadow, caused by the non-actinic color of the lips, as where they are brightest, and therefore most beautiful, the photograph gives the reverse effect. A good deal can be done on the negative to rectify this.

No man will succeed to any great extent as a portraitist who does not exercise a constant and intelligent observation on all that affects his sitters. Details that to a careless or unobservant mind might seem too insignificant to pay any attention to, may yet be of the greatest importance. The things which go to make a pleasing portrait in any one instance may be in themselves little matters enough; the turn of the head, one inch this way or that, the raising or lowering of the eyes ever so little—nothing, in fact, is too small to notice. Let the eye of the operator acquire the habit of taking in his whole sitter. An artist about to paint a portrait considers it necessary to have numerous interviews with his subject, so as to become acquainted with what is natural in the way of pose and expression, in many instances even residing with them for a time, and opportunities are afforded thereby of studying them under various conditions, seeing them in their different costumes, and selecting the one he thinks most suitable. How different is the expression of the faces of people when at their own tables, or in the midst of friends on any social occasion: how vastly different from what we see them when about to take the cap off the lens! An active consciousness enters in and deprives the picture of natural grace and beauty, as well as freedom of expression; the hands very often suffer, losing entirely their natural disposition. When you are thoroughly acquainted with your subject you cannot be deceived by this conscious expression, and you can remind your sitters that they are not looking like themselves. Now, how can this be said or done when ten minutes previously you did not know such a face was in existence? This is the only reason I can give for so many random and missing shots in photographic portraiture. Knowledge of the subject, I say, is more or less a necessity when the highest results are aimed at. But you may say, How is the knowledge to be obtained? Are photographers to spend a week or fortnight at their clients' houses previous to photographing them? Such is impracticable, and certainly in the case of small-sized photos, photographer and sitters in the majority of instances must be strangers; but my remarks point more to larger photos direct from life. I consider it risky—I do not say impossible, because it depends on the subject—to take a large direct picture of a person ushered into your presence and out again in the space of twenty minutes. On a first visit a cabinet might be taken, and on a second visit the large one when you have gained the necessary acquaintance with your sitter's expression. It is a wonderful art, and because it is so, greater wonders are expected to come out of it. The stream of its rapid advance is not confined to one channel, but it continually overflows and tends with eager haste to fields and pastures new.





By NED VAN BUREN
NEW YORK CITY

BY NED VAN BUREN
NEW YORK CITY

EXPRESSION AND LIGHT

By ANTONY GUEST

IN a recent article the above words chanced to come together, and it seemed that their association was happy, for it would be difficult to invent a combination that more completely sums up the qualities which should be the special aim of the artistic photographer. Expression gives vitality to his work; light imparts the appearance of Nature. In considering these two essential characteristics of all good pictorial, as distinguished from decorative, work, it is well to bear in mind the great breadth of their scope. Expression marks small things as well as big, still-life and humanity, the sentiment of Nature, and, what is of no less account, the mood of the artist. The poise of a chair, the spring of a bough from a tree, the dreary solemnity of winter, the brightness of spring, and the personality of a man or woman, all have significance which is to be rendered by a negative no less than by a positive process, namely, the rejection of such matters as do not in themselves aid in conveying the particular idea that it is desired to produce. It is not that details should be ignored merely on the ground that they are not suggestive, for all things have expression; it is because they do not always express themselves helpfully to the main intention. No passengers or stowaways are wanted; all the crew must be working units, and things that do not add vitality to the artist's sentiment or his theme are encumbrances that may be thrown overboard.

In a general way, it may be said that details are the enemy of expression. Among their abundance there are few that help, and for the most part they are so much weight carried to no purpose. But some are significant and valuable, and it is necessary to search for these and to select them with as much discriminating regard for their usefulness as a traveller would apply to the contents of his knapsack. If their weight or bulk is more hindrance to the attainment of the end in view than they can compensate for by their assistance, they must be discarded. For instance, if one desires to enforce the brilliance of sunlight one need not have a pair of sparkling eyes in the foreground; and, conversely, if one is stirred by the radiance of a pair of eyes, and longs to represent them in all their witchery, there is no need to place a stream of sunlight in competition with them. To do so would be to weaken, probably to destroy the effect desired. This, it may be said, is an extreme instance; but in other cases there is only the difference of degree, and the principle applies throughout the whole range of pictorial art. Details either help or hamper the paramount idea; the point is to ascertain exactly what their influence may be before accepting them or throwing them over. Some artists will tell you that they feel this influence without precisely weighing it; but this is a dangerous test for such as have not cultivated their artistic sensitiveness to a very high point.

Details in pictures may be regarded in much the same way as ornament in architecture. Ornament is appropriate when it emphasizes and beautifies the lines of construction; but the structure is the important thing, and if the decoration hides it, or claims attention merely on its own account without reference to its mission, it becomes superfluous, and, therefore, detrimental to the whole.

It is the structure rather than the ornament that tells, and this reminds me to point out that expressiveness must be sought beneath the surface of things. The overlay of detail often masks construction, but should not be so accentuated in the picture as to prevent the construction from being felt. Especially in portraiture is it necessary to make the accidental folds of the clothes subservient to the natural lines of the figure. This is a matter that I am afraid is too often overlooked and the consequence is that many portraits, apart from the faces, are mere representations of clothes, instead of as they should be, renderings of the draped figure. Of course, one need not try to emphasize the figure so completely as the Greeks did with clinging garments, rendered more clinging by being damped. But the figure should be expressed even when in modern attire, and this can be done partly by eliminating misleading lines in the draperies, and partly by cherishing such natural lines as are actually defined. The expression of the figure should accord with the expression of the face.

At the same time it may be suggested that photographers who take up portraiture should give some time and perseverance to the study of the nude, for unless they understand the construction of the figure it is difficult to see how they can give it due expression. No doubt they regard the face as more important; but here, again, it is necessary to look beyond the surface and to note the structure. It is not so much the superficial, and perhaps accidental marks, that give expressiveness to a face as the permanent formation of the bone. But this is a matter that I referred to quite recently, and need not dwell on now. The point is, that expression is found beneath the surface. The structure of a tree must be looked for under its covering of foliage, and the mood of Nature is felt apart from her many bewildering details. To get at the individual one may often have to forego a variety of plausible superfluities. At least the portraitist is on safe ground when he devotes his attention to what is enduring, and refuses to rely absolutely on exterior adornments or defects. If he has a penetrating and sympathetic vision he may reveal an indication of the underlying spirit.

But the artist must also express himself, for in this way he divests his work, whatever it may be, of its mechanical quality and gives its temperament. He need not trouble himself much about this, for he is certain to make his work as characteristic as his hand-writing if he avoids the two pitfalls, imitation and timidity; not copying other workers' styles and having the courage of his own convictions. So he will assert himself unwittingly. It is only when there is a conscious effort at self-expression that it degenerates into affectation. It is scarcely possible to lay too much stress on the importance of the individual outlook of the artist. The expression of Nature is often subjective, depending on the mood of her interpreter. Two men may represent the same scene and their pictures may be absolutely different yet equally true, because they each reflect a particular mood or temperament. One picture may be gay, the other melancholy. One may be a joyous revel in the beauty that exists; the other poetical, mysterious, and restrained. An autumn day may cause one artist to rejoice in the feast of color, and another to repine at the presage of winter. In either case the mood will claim sympathy if it is decidedly expressed; but, as already remarked, if this is to be done, an elimination of such matters as do not help to convey the message and make it clear will be necessary.

Expression is, of course, closely allied with treatment, for the completeness with which an artist succeeds in conveying the spirit of his theme depends much on sympathetic handling. One does not want dainty workmanship in the representation of grim rocks, and such bold, rough handling as would be justified in their case would not be appropriate in a picture of flowers or children. The nature of the subject calls for a corresponding feeling in the technique, so that not only the rocks but the whole picture may convey a rugged impressiveness in one case, and in the other the sense of refinement may be aided by endowing the work throughout with delicate manipulation and tone. Such harmonious relationship between subject and treatment adds to the completeness of the whole and strengthens its effects.

Some think to drive their statement home by the aid of vigorous contrast, and may go to the length of representing a lily with a black background to enforce the whiteness of the flower. But for a picture to excite pleasing emotions and to claim recurrent attention we want harmonies, not contrasts. Contrasts astonish, but only for a moment, and when the surprise has subsided there is no insinuating and lasting appeal such as is found in a quiet design that the eye can rest on. This brings me to the consideration of light as an aid to expression, for if there are violent contrasts of light and shadow their clamor is very likely to drown instead of strengthening the sentiment that the artist wishes to perpetuate. It may be said that the whole idea is to render the effect of a brilliant light opposed to a dark shadow; but, even so, it will be found necessary to modify the contrast, for the light has color and the shadow has mystery, and these qualities, further influenced by atmosphere, are not to be obtained through mere black and white. They demand tone. The lily may be in sunlight and the black fence behind it in shadow, but neither can escape the harmonizing veil of atmosphere and reflected color. Nature's contrasts, though it may sound paradoxical, are all harmonies; in fact, she works for harmony, and those in sympathy with her will aid her effort and not endeavor to force her into unusual contrasts of light and shade.

Light is made expressive, not by contrast, but by being used in the appropriate place. Nature defines light, all things in light, but the artist exercises discriminating selection, for he has to think not only of the virtues of light as a means of definition, but also of its decorative influence on composition and its aid in insisting on the paramount interest of the leading subjects of his theme, and this insistence he will wish to carry out with graceful urbanity rather than by glaring advertisement, remembering, too, that if the highest light is employed on a matter of secondary significance, this immediately assumes an importance that is more than its due.

Natural light is distributed without any such forethought, and it is in supplying the selectiveness and economical treatment omitted by Nature that Art has its mission and the feeling of the artist finds expression; forming a happy partnership between man and Nature, one bringing the brains and the other the capital, each influenced by the other, and both gaining something from the combination.

Not only the high-lights but also the more subtle shades are full of meaning, and it should be remembered that when we speak of light we necessarily include shadow, its inseparable adjunct, for the character of light is explained not by the illumination but by the shadows. In this way are expressed the fundamental conditions of a scene—diffused daylight with no strongly-marked contrasts of light and shade; moonlight, with delicate contrasts; the degree of intensity in sunlight, which is recognized by the comparative strength of its shadows—the full sunlight of midsummer by well-marked shadows, always, however, transparent and modified by the reflection of the sky; the weaker sunlight of winter by slight shadows very refined in quality. The strongest shadows are those produced indoors by artificial light, for there is no sky to reflect light into them and subdue their density. So light will express the season and often the time of day; but it also has a sentimental expressiveness. The sparkle of sunshine gives gaiety to a theme; subdued lights suggest thoughtfulness and repose and low tones may tend to melancholy or may help to promote a feeling of awe. Evidently, therefore, the artist has great possibilities of strengthening his message by the discriminating use of light, and this is a matter that I think deserves the more consideration since I have noticed a growing disposition to produce low-toned pictures without much regard for the particular sentiment that ought to be conveyed. The portrait of a bright young girl or a studious old man, sunny and cloudy landscapes, are often in the same low key, showing that the artist has not thought of the expressiveness that might be gained from light in one case or the other.

There is one other matter that ought not to be overlooked in discussing expression—the great value of simplicity. The plain, direct statement, unhampered by side issues, is that which makes its meaning clear and unmistakable. This with the assistance offered by light, with the piquancy of personal handling and with the adornment that comes of a decorative sense, is what pictorial photographers should aim at in producing expressive and effectively illuminated work.—*Amateur Photographer.*

THE PERMANENCE OF COLOR PIGMENTS[1]

By SIR WILLIAM ABNEY

SPEAKING generally, every pigment absorbs or abstracts rays of the spectrum which it does not reflect, and it is the collection of the reflected colored rays that gives the color of the pigment. Each particle of a pigment is composed of a very large number of molecules, and these molecules are formed of several atoms, held together by attraction to one another. The rays of light absorbed by the pigment may by their vibratory motion shake away from the molecules one or more of the atoms, decomposing the molecules, and thus change the particles of the pigment. This change in composition is shown as fading. Like the silver salts in photography, if a body is in contact with the pigment, which can take up the atoms of the shaken-off molescules greedily, then the fading in a given time will become more rapid. Such a body is found in the moisture in the air, so that a damp pigment fades more readily than a dry pigment. In the case where the atoms of the pigment, even with moisture present, refuse to be removed from the molecule, there is no fading.

It was owing to observations on the salts of silver, which behaved as just described, that our experiments on pigments were started. There is always moisture in the atmosphere, so that if a pigment is exposed to light under ordinary atmospheric conditions it is liable to fade; if it will fade at all the fading will show itself eventually. In our experiments the light employed was sunlight and skylight. The pigments exposed had various depths of color, No. 1 being the lightest, and No. 8 the darkest. Half of the paper washed with the varying shades of color was covered up with black paper, and the light had free access to the other half. The papers were exposed in glass tubes bent over at one end to form a hook. There was a perpetual change of air in the tubes.

The annexed table shows the pigments which were exposed to light in these tubes, and the results of the exposure. The last thirteen showed no signs of fading. The first thirteen are really unstable, and the whole list is placed approximately in the order of instability. The next thirteen are much less unstable:

Color	Composition according to Winsor and Newton
Carmine	Lake prepared from cochineal.
Crimson lake	Lake prepared from cochineal.
Purple madder	Lake prepared from madder root.
[1] Scarlet lake	Lake prepared from vermilion and crimson lake.
[2] Payne's gray	Indigo crimson lake and carbon black.
Naples yellow	Mixture of zinc white and cadmium yellow.
Olive green	Quercitron lake, bone brown, and ultramarine.
Indigo	Extract from the indigo plant
Brown madder	Lake prepared from madder root.
Gamboge	A preparation from gum resin.
Vandyke brown	Native earth prepared for painting.
Brown pink	Lake made from quercitron bark.
Indian yellow	Prepared "purree" from India.

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[1] A paper read before the Royal Photographic Society of Great Britain.

[1] Scarlet lake more recently prepared is now made from vermillion and alizurin crimson.

[2] Payne's gray is now made from carbon black ochre and French ultramarine. Both Payne's gray and scarlet lake should now be much more permanent.

Color	Composition according to Winsor and Newton
Cadmium yellow	Sulphide of cadmium.
Leitches blue	Mixture of Prussian blue and cobalt.
Violet carmine	Lake obtained from root of anchusa.
Purple carmine	Lake obtained from root of tinctoria.
Sepia	From the cuttlefish bags.
Aureolin	Double nitrate of cobalt and potassium.
Rose madder	A lake from the madder root.
Permanent blue	A pale variety of French ultramarine.
Antwerp blue	Prussian blue and alumina.
Madder lake	Same as rose madder.
Vermilion	Mercuric sulphide
Emerald green	Aceto-arsenate of copper.
Burnt umber	Calcined raw umber.

Yellow ochre	Native earth.
Indian red	A variety of iron oxide.
Venetian red	Artifically prepared sesquioxide of iron.
Burnt sienna	Calcined raw sienna.
Chrome yellow	Normal chromate of lead.
Lemon yellow	Chromate of barium.
Raw sienna	Native earth.
Terra verte	Native earth.
Chromium oxide	Chromium sesquioxide.
Prussian blue	Ferro-cyanide of iron.
Cobalt	Alumina tinctured with cobalt oxide.
French blue	Artificial ultramarine.
Ultramarine ash	Extract of lapis lazuli.

Looking at the composition of the last thirteen permanent colors we cannot fail to notice that they are all native earths or oxides of metals, with one or two exceptions. In fact, all have a mineral basis, whilst the remainder of the list which have the most tendency to fade are mostly organic derivatives.

It must be recollected that the light used in obtaining these results was of the most intense nature, and not that to which ordinary water-color paintings would be exposed.

The second thirteen colors are probably colors which would not fade in anv ordinary light. It must, however, be remarked that when mixtures of colors are employed those colors which are more or less fugitive have a greater tendency to fade than when tested alone. For instance, in a mixture of indigo and Indian red the indigo fades more easily than the indigo does when unmixed. Russell and myself proved this by experimenting with thirty-four mixtures, such as were often used by artists.

The case which I mentioned of the rapid fading of vandyke brown in the light from the sky was probably due to the vandyke brown being used mixed with other colors.

It may be as well to state here we found experimentally that practically every colored pigment exposed to light *in vacuo* declines to fade, and the same may also be said of pigments exposed in perfectly dry air or oxygen, a condition which is non-existent in the atmosphere in which pictures are exposed to light. The presence of moisture is always required to effect a change in color, and we also found that the bluer the light to which colors are exposed the more rapidly, in most cases, will the fading take place.

A reference must here be made to the effect of the light from the sky on pigments exposed for nearly two years in a frame in a window with north light. The following colors were in the frame:

Antwerp blue
Prussian blue
Leitches blue
Indigo
Gamboge
Brown pink
Indian yellow
Naples yellow
Lemon yellow
Vandyke brown
Venetian red
Crimson lake
Vermilion
Rose madder.

Carmine.
Prussian blue and burnt sienna.
Prussian blue and vandyke brown.
Prussian blue and gamboge.
Prussian blue and Indian red.
Indigo and vandyke brown.
Indigo and burnt sienna
Indigo and Indian red.
Rose madder and raw sienna.
Antwerp blue and raw sienna.
Vermilion and chrome yellow.

Our report on the effects of this moderate daylight was as follows:

Of the single colors, gamboge, indigo and Naples yellow had slightly faded; brown pink had faded perceptibly to 6 (the deepest shade but 2); carmine had *bleached* to 3; vandyke brown had faded to 1 and was fainter to 4; and crimson lake had faded to 5; and all the darker shades had become paler. In mixtures, one of Prussian blue and burnt sienna, that had changed, the blue had faded. With Prussian blue and vandyke brown, and with indigo and vandyke brown, the vandyke brown had faded. With Prussian blue and gamboge, the gamboge had slightly gone in No. 1 and all shades had become browner. With indigo and gamboge, all the shades had become pale throughout. With indigo and Indian red the indigo in No. 1 had gone entirely and partly in all tints. The other colors, both single and mixed, had not changed.

This experiment confirms the results which had taken place in strong light. We may, therefore, take it that the list of fugitive and stable colors we have given is the same in feebler light as it was in sunlight. From the permanent thirteen colors we have given, and from the thirteen semi-fugitive colors, we can form a good gamut for the water-color artist.

Various artifices from time to time have been proposed for preventing the fading of pictures in light. A novel and effective one theoretically was to make the frame into a vacuum chamber. But so far as I know there were practical difficulties existing which prevented its general adoption. Recently a glass has been proposed which is said to prevent chemically the active rays from reaching the picture. I have roughly and not exhaustively tried a specimen of this glass, and exposed fugitive pigments beneath it to light this autumn. I have not found that it prevented the fading of the colors I tried, and I should hesitate to adopt it myself. But I hope that others will try its effect. If it is proved efficient it would be a great boon, and the list of fugitive colors might then be of no use. I have said that the blue light (which includes the violet) is that which is most chemically active. I found that if a skylight was glazed with signal-green glass and an orange in right proportions to make a white light by their mixture, the colors of pigments appeared as in ordinary white light and the chemically active rays were cut off. The committee I mentioned in my paper satisfied themselves that such was the case and the Raphael cartoon gallery was so glazed. The public seemed unaware of the peculiar mode of glazing.

May I be allowed to become a little personal for the moment? Having studied the theory of colors from a scientific point of view for more years than I like to remember, when I retired from the Civil Service some eleven years ago I took to painting in water colors as an occupation. Naturally I endeavored to get a gamut of colors which should be sufficient in their range and at the same time as permanent as possible. My color-box now consists of:

Vermilion
Light red
Rose madder
——
Aureolin
Yellow ochre
Raw sienna
Cadmium yellow
Madder yellow
Lemon yellow
——
Emerald green
Viridian
Hooker's green (A new mixture)
Sunny green
Cobalt

French blue
Antwerp blue
Cyanin blue
Violet cobalt.
——
(An imitation and permanent) vandyke brown.
(An imitation and quasi-permanent) brown madder
Turner's brown.
Burnt sienna.
Neutral tint (from my own formula)
Ivory black.

All these colors are either in the list of the thirteen permanent colors, or come near them in the next thirteen. None of the colors is in the first thirteen, which, as already said, I class as fugitive colors.

Before adopting these colors I was anxious to see how the mixtures imitating colors with known names would stand the light. A year or two after the report had been published I determined to try if a short cut could not be found to test the permanency of any color. Some experiments I had made with certain photographically produced colors led me to think that the action of light on pigments in the presence of moisture might be a secondary action, and that the fading might be due to the formation of some oxidizing agent produced by the light on moisture in the presence of oxygen. It had been proved in our report that the exclusion of all air from the color prevented fading, and that colors did not fade when *dry* oxygen was in contact with them, and that only when there was the addition of moisture did the fugitive colors fade. It appeared to me that if oxygen were ozonized in the presence of moisture, the action might be the same as when light was acting with no added ozone present; in other words, that light itself tended to produce an ozonized atmosphere in the presence of moisture, and that it was this which caused the fading.

To test this, strips of the same colors as those which were exposed to the light were moistened and placed in a tube through which ozonized oxygen was passed in a slow current. The oxygen was ozonized by an ozone tube connected with a coil. As I anticipated, there was a fading of those colors which were affected by light. I have already given the list of single colors which were tried, in their order of "light" stability. Practically this same list is here repeated in the following table, but it also shows the times of exposure to the ozone current which were required to cause fading or destruction of those colors which light had been able to alter. The times given as necessary for ozone to act are approximately the relative sensitiveness to fading by the method described.

Pigments in the order of fadings by light	Time of exposure to fade in damp ozonized air.	
	h.	m.
Carmine	0	10
Crimson lake	0	30
Purple madder	0	20
Payne's gray	1	0
Naples yellow	0	45
Olive green	1	5
Indigo	0	40
Brown madder	2	10
Gamboge	0	50
Vandyke brown	1	15
Brown pink	0	30
Iridian yellow	4	0
Cadmium yellow	4	0
Violet carmine	4	0
Aureolin	Unchanged	
Rose madder	4	0
Permanent blue	3	30
Vermilion	Unchanged	
Emerald green	0	45
Yellow ochre	Unchanged	
Indian red	"	
Venetian red	"	
Burnt sienna	"	
Chrome yellow	"	
Raw sienna	"	
Terra verte	"	
Chromium oxide	"	
Cobalt	"	
French blue	3	30
Ultramarine ash	Unchanged	

The same colors were exposed to dry ozonized oxygen, all moisture being excluded. The paper and pigment were carefully dried, and the oxygen had to bubble through a series of bulbs containing strong sulphuric acid, to absorb any moisture which might have been in the oxygen. In no case did the dry ozonized oxygen have any action on the pigments. The most fugitive came out of the exposure-tubes unaltered.

This, be it remembered, was the same when the exposure to light took place in dry oxygen. The pigments remained unchanged.

This experiment proved that unless moisture were present with the ozonized oxygen the test did not work.

It will be noticed that eleven of the first thirteen colors, which in our list showed no change under the influence of light, were taken, and only one of them, French blue, showed any change under the influence of ozonized oxygen and moisture, and that was very small. Of the other twenty-six colors only twenty-three were experimented with, and all of them showed an alteration. Of the second thirteen in the list, seven were tried and all proved to be fairly stable colors; aureolin and vermilion, which under the action of light blackened, showed no deterioration; the others, after an exposure to the ozone, showed slight deterioration after about four hours. Of the thirteen most fugitive colors in the list, scarlet lake was omitted. Brown madder and Indian yellow appeared more stable than they did when exposed to light, the remainder followed very fairly the order of fugitiveness given in the list.

Mixtures faded under the influence of damp ozone more rapidly as a rule than did the fugitive colors by themselves. Where one of the colors was stable the fugitive color completely disappeared, and where both were fugitive—as, for instance, a mixture of indigo and gamboge—both disappeared.

It might be thought that peroxide of hydrogen, which is used for altering the color of hair and for other purposes, might be a substitute for the ozone treatment. So far I have found it quite inoperative in regard to pigments such as have been tested.

Returning for an instant to my own water-color box, I show the results of the ozone treatment. The only case where any fading has taken place in any of the colors is that of rose madder, which had a most prolonged exposure. It will be noticed that where I have replaced a color by a mixture having the same tint (*e. g.*, Hooker's green, made of Prussian blue and aureolin), the color is a stable one, since both the mixing colors are stable. I have brought a few of the really unstable washes to show you, and you can judge of the effect of the ozonized damp air upon them.

With oil paints the ozone test has so far, with me, been unsuccessful. The ozone seems to attack the medium, as the color is so successfully locked up in it that very little effect is produced, even with the most fugitive colors. This is not what takes place when light acts on oil colors, for in a series of experiments (not yet published) made with them the same final results were obtained as with water colors.

A FEW DON'TS

DON'T lose patience in the operating room.

Don't make an exposure of your sitter until everything is right—then go ahead.

Don't expose too short or too long.

Don't stop with one, two, or three trials; don't make them all alike.

Don't say "smile now," "look bright," and wear a frown yourself, or your subject will have it, sure.

Don't pose the eyes straight in line with the direction of the head; turn them a little to the right or left as the subject demands.

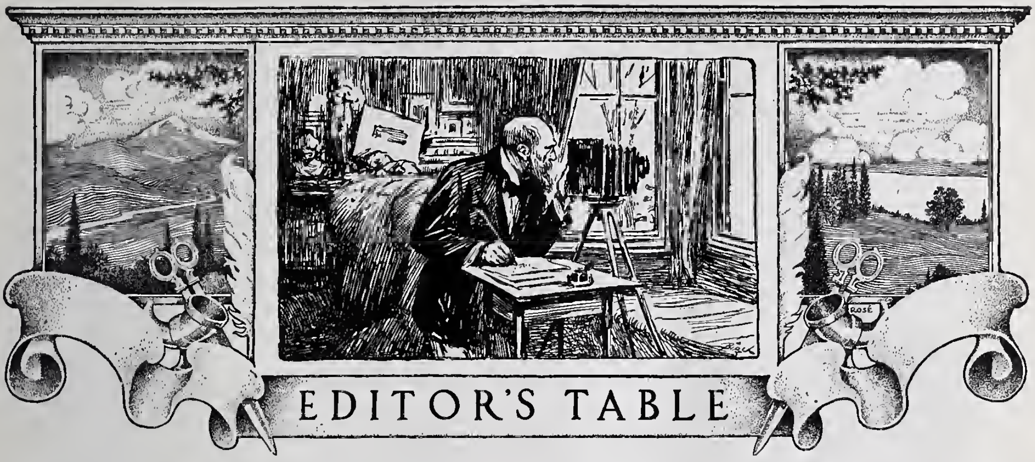
Don't allow anyone in the operating room while making a sitting, unless it is a baby, and then only one person.

Don't allow any one to be a clown for you.

Don't crowd your subject with furniture and backgrounds; it is bad taste.

Don't pose your subjects so as to make them look dreamy and lifeless.

Don't keep your place open on Sunday.



EDITOR'S TABLE

THE NATIONAL CONVENTION

THE time for the National Convention is approaching very rapidly, and we would urge all photographers who have not yet decided to attend to make up their minds at once and arrange to be present.

The city of Milwaukee offers many attractions and has the reputation of being the cleanest and coolest city in the Middle West. The building where the Convention will be held is ideal for the purpose, offering not only a spacious and cool auditorium for the meetings, but an abundance of large, light and cool rooms for the art display and for the use of the dealers and manufacturers.

Artificial light has come to stay; in fact, no one seems to think that daylight is necessary to photographers. Complete demonstrations in the use of the various artificial lights now on the market will be made. There are more inquiries about the use of artificial light than anything else pertaining to photography at this time. It will pay you to go to this convention to see the different artificial lights demonstrated.

Then there is an Interstate Trophy Competition. Better get in on this. $250 will be given to the best display of photographs by any one of the affiliated associations. This exhibit is open to any member, whether active or associate. Here is your chance. Get your pictures there on time so that you can compare them with the work of others. Three judges will be chosen to award the salon honors.

Some of our well-known and successful photographers, men who have the reputation of making good pictures and making money also, have been engaged to give part of their time reviewing for any exhibitor who requests their services. Each reviewer will be assigned to a certain screen and will be on hand at that screen at stated hours. You can talk with him and he will tell you how he thinks you can improve your work.

The Manufacturers' and Dealers' Section this year promises to be a very representative one.

Any amount of new apparatus placed on the market during the past year, apparatus that means a saving of time and the saving of money and the saving of employees, will be on exhibition. In fact, there will be the largest display of photographic apparatus at this convention ever made in the country. Better inspect this display and see how you can improve your studio.

Milwaukee is well supplied with good hotels—the accommodations are ample and the rates reasonable. Photographers who expect to locate at the official headquarters had better make their reservations at an early date.

Make up your mind to attend this big convention and make your plans now. All the indications point to a highly successful convention, and you really cannot afford to miss it. The place is Milwaukee, Wis., and the time August 23 to 28.

PRACTICAL PAPERS ON STUDIO WORK AND METHODS

Keeping Fit

By some means or other—quite how, I do not know—photography has long ago acquired and retained the reputation for being an unhealthy calling, chiefly owing to the use of "all those chemicals and things," as one hears it expressed. Certainly, I grant that work *can* be, so carried on as to lead to impaired health. On the other hand, if reasonable care is used, it will be found quite as healthful as any other indoor occupation.

There certainly are some things, however, which, if attended to, would tend to ensure and preserve decidedly better health among studio staffs. It is not that they are ill exactly, but they are often in that indescribable "below par" condition when minor ills make life and work a weariness, and work has a tendency to drag along and not get done up to time—a state of affairs bad alike for the business and the worker.

To take the biggest sinner first. There is the dark-room—often, indeed, a veritable "dark" room, where for want of a sufficiency of light the worker contracts a perpetual frown, round shoulders and a premature stoop. With modern plates and papers there is really no need for this state of affairs. There ought to be a red or yellow window of at least 18 ins. each way, illuminated from the outside; this is especially important if incandescent gas or oil lights are used, as both of them consume a good deal of air and also give off a good deal of heat and smell, which are much better outside the dark-room than in. It is neither difficult nor expensive to make an opening in a wall or partition if none already exists, and where a worker may have to stay four or five hours at a stretch sometimes, in busy seasons, in the dark-room, the atmosphere becomes positively poisonous, and the result is headache—often the bad sick-headache variety—biliousness, disinclination for food, and at the end of a few weeks a decidedly run-down condition, rendering the worker much more susceptible to metol-poisoning, blood-poisoning and kindred evils.

Then, again, the only time that many dark-rooms are really dry is on Monday morning. Splashes and drippings accumulate, sometimes a dish or sink runs over, and only a half-hearted attempt is made to clean and dry up the floor.

Most dark-rooms are provided with a wooden floor, loose, and made of strips of wood nailed grid-fashion to thicker wood, so that the worker's feet are kept off the floor; but many of these are made so big and heavy that it takes two people to move them. These boards *ought* to be put out to dry each night, but especially where the worker is a female, they are not likely to be, because they are too big to manage single-handed. If they were made in smaller sections it would probably be much better both for the dark-room and the worker, because they would be more easily handled.

Then, also the inside of the dark-room might well be painted white, as bottles, etc., would be much more easily seen against a light background, and if a little care is given to the light there is really no fear of fogging, while the greater amount of reflected light will make it much easier to see what is being done. It should be borne in mind that a red light is always a trying one to work with, and as much as possible should be done to minimize its bad effects. Often a green safe-light could be used instead, and would be much more healthy, preventing many a bad headache.

The question of ventilation is always a vexed one, and often a neglected one also. Much benefit, however, might be derived from a piece of perforated zinc let into the wall high up, or a ventilating brick, preferably to an outside wall. A little piece of wood, forming an inverted Λ, and nailed against it, will cut off stray light, and in this way many a corner might be utilized to form an automatic ventilator, whereby the dark-room worker would much benefit and often lose that pasty, unhealthy look that in itself condemns the owner's working conditions.

Another unhealthy occupation, if long continued, and in the way usually carried out, is dry-mounting. The dry-mounter, for convenience, is often tucked away into some odd corner, and because of the already-fitted gas connections, etc. is never moved. Now, a dry-mounter ought always to be under a window or some other ventilator, and the top of the latter at least should always be kept open while mounting is in progress, as the fumes of the gas and the melting shellac tissue combined are most injurious, and provision ought to be carefully made for the escape of the fumes, especially if the worker is at all weak on the chest. Generally a length of rubber tubing, or a flexible extension which will allow of the moving of the machine, is all that is needed, and certainly costs very little. The saving of headaches, etc., will, however, be considerable, particularly where girls are concerned.

To say that poison bottles, etc., need careful labelling is of course needless; but a friend of mine goes a step further, and in his workrooms hangs a carefully written and framed paper pointing out each substance used of a poisonous nature, and the antidote and treatment briefly stated, in case any accident should occur and any be taken inadvertently. I might say that the owner was himself once nearly killed by an accidental dose of ferricyanide taken one hot day in the dark-room. It is, however, a good idea, as few workers would know the remedies needed if asked off-hand. I know one studio well where it was long the custom to warm up the tank developers in an enamel saucepan, and this after a rinse or two with cold water would be used to heat the milk for the assistant's tea, etc. This is only one instance of the sort of thing that often regularly goes on, and then they sigh because—save the mark—they do not feel "quite fit."

In many workrooms the ordinary shelves are placed much too high for the comfort of ordinary workers, and inasmuch as girls often look after the mount stock, I would like to point out that this reaching, or rather overreaching, entails a very serious danger of causing a serious rupture, often a lifelong complaint once it is contracted. To many of our returned service men, stiff in arms, legs, etc., it is also a danger, and a pair of steps or some other means of shortening the reach ought always to be at hand, for a package of large mounts, say 12 x 10, is no light weight.

Frequently the finishers are inclined to stoop and crouch over their spotting tables, and this again is very unhealthy and bad for the lungs, as well as resulting in more or less perpetual backache. Either the table should be raised, or the seat lowered, until working can be carried on in comfort. The adjustable stools and chairs used by typists in good offices are most convenient. Also, there ought to be some proper place for hanging the outdoor garments of assistants in wet weather, so that they may stand some chance of drying between whiles, and not be so closely huddled up that the damp simply goes on soaking in, with the result that the next time the overcoat, etc., is put on they strike damp and chill. The outcome of this is usually a cold or chill next day, and a day or two's absence from work.

Also, a great many workers complain of headaches and eyestrain. This, of course, should be at once attended to, for the eyes are a precious possession; but often it arises from spotting, etc., with a glare of light on a level with the eyes. The light ought to be reflected downward to where it is wanted, and screened well away from the eyes. A sheet of brown paper or card, with one of white pinned inside, will often serve this purpose in a rough and ready fashion, and the worker will be surprised at the comfort it gives to the eyes. Half-an-hour spent sometimes in fixing up a comfortable light, instead of just jogging along anyhow, will repay itself in comfort and speed hundreds of times over.

One frequent complaint is metol-poisoning and similar skin trouble. Well, this often arises in the first place from lack of care in drying the hands properly. You cannot expect a damp towel to dry your hands thoroughly; also, its touch is at times very painful to sore hands. A far better way is to first dry the hands on a freshly wrung out wash-leather, and then finish them on the usual towel. The leather is a splendid thing to absorb the moisture, and for anyone who suffers from chapped hands or tender skins it is a great comfort. The nails are often the first source of trouble, and these should be kept quite short and carefully scrubbed inside, for irritant poisons will often find a lodgment under the nails—undisturbed, too—when they cannot anywhere else. One has only to watch the care bestowed upon this by any operating surgeon to have this point driven home. Also, after work, if the hands are regularly washed with carbolic soap as used in hospitals, it tends to keep down this pest of metol-poisoning, a very nightmare to some workers. Most excellent antiseptics for any who fear this trouble will be found in lysol and its many preparations, in a solution of which the hands should remain, quite covered, for five or ten minutes, afterward drying carefully on a clean towel. Also clean towels once a week, if you wish to be free from skin troubles, and also *do not* use them for teacloths, to wipe the cups with, as I have seen done.—G. E. H. G., in *B. J.*

Genius and Technic

There is a small class of photographers who affect to despise the technical side of their work, fearing that they will not be regarded as real artists if they are acquainted with the composition of their developing solutions or the aperture of their lenses. To these we have nothing to say. There is a much larger class which suffers under the same disability, but not with intent. Their sin, if it can be so called, is simple ignorance. In nearly every other art or science a considerable amount of drudgery is necessary before the novice can blossom out into a practitioner, but in photography the possession of suitable apparatus and premises is, in the opinion of the youthful enthusiast, all that is necessary to bridge the gap between button pressing and professional portraiture. We willingly grant the postulate that taste and artistic knowledge are inherent in the individual, but the question that always remains is: how is a certain impression to be transferred to paper in the most perfect and effective manner? We may compare the untaught photographer with a person who can read music, and appreciate its merits, and straightway attempts to render Bach or Chopin before learning to play scales and five-finger exercises.

Many who have attained a temporary success in photography have done so on the strength of a few lucky flukes, and have found no small difficulty in keeping up their reputation. As their successes have been obtained they knew not how they could not be repeated except by accident, and a level, hardly reaching mediocrity was all that could be attained, aimless experiments with fresh plates and papers only serving to depress rather than to inspire.

To avoid this unhapy state there is nothing for it but to give careful attention to the technical side of photography until it is clearly understood how lenses differ as regards definition, focal length and rapidity; why some plates render colors satisfactorily while others do not; the varying qualities of plates as shown in the vigor or softness of the image; the power of printing papers to reproduce the tonal value of the negative, or to give the precise shades in monochrome which the photographer desires. Such knowledge cannot be evolved from the inner consciousness of the worker; yet without it, unless saturated with self conceit, he must acutely feel his shortcomings, although he does not dare to confess them.

One of the weak points with the untechnical worker is exposure. Fortunately, there is so much latitude that exposures varying between one-half and four times the normal amount will all yield printable negatives, but the farther the correct exposure is departed from the farther also is the result from the effect aimed at when the exposure was made. Even studio exposures can be calculated by simple means with some degree of precision, and guesswork, the terror of the dark-room assistant, avoided.

Although a photographer's education is never completed, no very severe course of study is needed to enable him to work intelligently. For example, the selection and use of lenses call for no knowledge of mathematics or even arithmetic, while the necessary knowledge of chemistry is little more than is required in cookery, so that no one need be deterred from entering upon it. If it can be obtained, personal instruction is the quickest and most pleasant way of learning photographic technic, since the student has the opportunity of clearing up any doubtful points as he goes on, and can explain to his mentor in what direction his aspirations tend. It is to be regretted that the old style of photographic society, where professionals, amateurs, chemists, and opticians met for mutual help, has almost ceased to exist, for much good work was done in this way. The study of standard books, such as those of Watkins, Abney and Chapman Jones, cannot fail to be helpful, but most elementary treatises on photography lack the necessary teaching note which the student requires. Much may be learned by attending trade demonstrations, and such fixtures as the P.P.A. Congress should on no account be missed. We have found among modern photographers little of the old-fashioned jealously and secretiveness which was common a generation ago among non-society-goers, and it is our hope that we may attain the American position where the big men in photography esteem it a privilege to be called upon to demonstrate their methods of working.

We have so far been addressing those who have entered the ranks of photography from the art side at a mature age. In the case of young people who are entering the profession the technical side should be the first care, and a proper course of training, either in a good studio or recognized school, should always be the preliminary step to opening a studio.—*B. J.*

Portraiture with a White Background

The predominating idea in the production of of white-background portraits must be to secure a delicate picture. For this reason, ladies and children are more suitable subjects than men; since they are able to wear light, flimsy garments, and draperies which lend themselves well to the style. Fancy costumes, also, are often very suitable. I do not say that successful results cannot be produced with the darker, heavier draperies; but they are, at any rate, more difficult to secure.

The background itself must be one of the first objects of our attention. It is difficult to secure a pure white. so many of them containing a strong tinge of yellow. The ordinary plate is not sensitive to yellow, so we must avoid such a shade as much as possible. On the other hand, it is very sensitive to blue, and wherever that color appears in a photograph it is easy to secure density in the negative. So the best white background to use is one of a blue-white. As the background has to surround the subject, a continuous background is necessary, that will hang behind and also extend along the floor to some distance in front of the model. The material used is the same as is sold for "plain" backgrounds by photographic dealers.

Some fast plates I find of no use for this work, owing to the fact that if they are at all over-exposed it is difficult to get a clean negative with them. On the other hand, if the plate employed is a slow one, harshness often results. A plate of medium speed, say 220-250 H. and D., will be found best.

Exposure is a very important matter. We must remember that we are dealing with a subject containing a great deal of light, and over-exposure will result in a weak, dirty negative If this is obtained, it is better to destroy it at once, so as not to be tempted to waste time in trying to obtain a nice delicate print from it. Underexposure is just as bad the other way, and overdevelopment, resulting in a negative that is too hard and thick, will be fatal to success. Instead of giving a delicate print, we shall have a "study in black and white." In short, for this work it is essential to have the negative correctly exposed and correctly developed. In the plates which I use, development is correct when the outline of the image is clearly shown on the back of the plate.

The scheme of lighting to be adopted in white background work will depend upon the fancy of the worker. The great thing is to bear in mind that no strong contrasts must be used. For instance, the style which gives a strong line of light down the side of a face, throwing the remainder into shadow, is not good: although a modification of it, or the same idea simplified, allowing the light to play on one side of the face, but only a little more than on the other, so as to avoid strong contrasts, will give good results.

When quite ordinary round lighting is employed a great improvement in effect is often secured by allowing a little light to play on the light side of the costume, so as to cause it to stand away from the background. Dark furniture should not be used with light costumes, if it can be avoided, as it is very often the cause of too much contrast in the finished print.

Provided the quality of the negative is good, almost any process of printing may be employed, from P. O. P. to bromoil, so it cannot be said that the worker with white backgrounds has a limited selection of papers. Those most generally used are platinum, carbon, and bromide; and in this article it will be assumed that bromide or gaslight paper is being used. The choice of surfaces is a very wide one; smooth matt being as suitable as any.

In making the print, we have to get a soft effect, the picture gradually passing into the white ground: and it is here where new workers are likely to experience the most trouble. It is done by vignetting, which, although apparently a simple matter in the eyes of many, is, to judge from a number of the results I have seen, anything but simple. The fault has been that, although the actual edges of the print may have been more or less soft, the general effect was a mask rather than a vignette. The cause of this defect is that the vignetting cards were fixed too near the negative, and the frame was not moved about enough during the exposure.

The print may be larger than the negative that is used: and for that purpose a larger printing frame will be needed. A piece of glass being put in the frame, a piece of card of the same thickness as the negative has a hole cut in its center the size of the negative, and is laid on the glass. The negative is placed in the opening of the card, which then, in conjunction with the negative, makes a level surface on which the bromide paper can lie evenly. For the actual vignetting, we take a rough proof from the negative and mount it on a piece of thin card. On the print we draw a serrated edge from an inch to an inch and a half away from the figures, and following the outline of the subject, and then cut out along this line with a sharp penknife. If this card were to be fixed down close on the rim of the printing frame, and a print made, it would give the hard vignette to which I have already referred. This can be avoided if, instead of fixing the card down tightly, we allow it to bend upward in a sort of arch. The edge of the opening should have two thicknesses of tissue paper pasted round it, one larger than the other, and the whole may then be covered with a third sheet of tissue paper. This allows the rays of light to spread more over the surface of the paper, and so produces a soft, fading edge to the subject.

In the case of many pictures trouble may be experienced in dealing with the bottom portion of the negative, because, although in a full length portrait the white ground will surround the figure on the negative, and, consequently the vignetting will then be the same all round, in a half or three-quarter length it is different. The figure extends right to the bottom edge of the negative, and, according to the strength of it, it will be more or less difficult to get the required softness. This difficulty is best overcome by putting cotton-wool between the vignette and the negative, pulling out the edge of it to allow of soft printing.

Another way to help toward soft results is to matt varnish the back of the negative, and then to work it up either with stump or pencil, making the edges as solid as possible, and graduating off as the subject is approached. The matt varnish can also be made to serve another very useful purpose. It is often necessary to emphasize a few high-lights or to make one part of a costume print to a lighter tone than another; in such cases a little pencil work carefully applied will do all that is required.

Except once more to emphasize the necessity for moving about the printing frame in such a manner as to allow as varied a direction of light to strike the plate through the vignette as possible, there is no need to say more on the subject of printing.

As a support for pictures of this kind nothing, to my mind, is better than to mount them on a stiff plain mounting board, and then to bevel the edges of print and mount by means of a very sharp knife. Another plan which looks very well is to use a pale gray, limp mounting board, which may or may not have a few pencil lines ruled round the edge of the print to serve as a border. A narrow faint wash of some suitable water-color may be used in place of the lines.

Those who like to put hand work on their prints will find that in this work they have plenty of scope for the exercise of their artistic talent. A sable brush and ordinary water-color (lamp-black), or a black lead pencil, used as if on ordinary drawing paper, will enable some charming effects to be obtained. Hard india rubber, or a sharp knife, enables us to pick out highlights on a print, as either will remove as much of the image as may be required, but a very light touch is necessary to ensure not scraping through the prepared surface.

Sometimes a white costume may yield a print in which the dress in the lightest parts is hardly discernible from the background. In such cases there are several ways of improving the result. One that many will find easy is to use a stump in the ordinary manner. When this work is finished any part of the costume that has accidentally been smeared at the edge can easily be cleaned up with a piece of india rubber.—*Photography.*

Bad Focussing

It is not uncommon in modern portraits to find that those parts of the image which one would expect to find the sharpest not so well defined as other points where sharpness is not essential. For example, we recently saw a bust portrait on which the sharpest definition was on the necktie, the eyes being noticeably unsharp. If this occurred regularly one would suspect either imperfect correction of the lens or want of register between the focussing screen and slide. Occurring occasionally, it can only be due to one of two causes, either carelessness in focussing or a slight movement of the sitter between focussing and exposure. Either of these contingencies can be avoided by exercising a little care. With the present tendency to reduce the exposure to the shortest limit, it is usual to work with very large apertures, and when the lens is of considerable focal length there is very little depth. To ensure absolute definition in the right place, it is advisable to use a proper focussing eyepiece, which also prevents eye strain on the part of the operator. Shifting of the head may be almost always avoided by posing the sitter in a comfortable position so that he is not tempted to relieve any muscular strain.—*B. J.*

Some Timely Resolutions

1. To store all my sensitive material near the floor in a dry, cool place.
2. To get all possible cash discounts for prompt payment.
3. To clear out all old or useless apparatus.
4. To put a little more science or system into my printing department, and to buy a good darkroom clock and thermometer.
5. To always weigh out my chemicals when making up developers, and no more "measure-by-handfuls."
6. To partition off a part of the workroom specially for making up solutions, well away from drying prints.
7. To stick to the maker's formulæ, and make it a personal job to compound all developers.
8. Never to risk my reputation by endeavoring to fix prints in a bath of doubtful efficiency.
9. Always work on the principle of "one dish, one job," and see that I have plenty of dishes.
10. To ask the manufacturers to send a further supply of "dummies," etc., when my window show begins to lose its freshness.
11. In technical difficulties to write to the manufacturers for suggestions or information.—*Rajar Limited.*

The Reflex for Home Portraits

There is perhaps no branch of photographic work in which the reflex camera shows to better advantage than in home portraiture, and it is rather strange that many who use these instruments for outdoor work continue to employ the old-fashioned landscape cameras for this purpose. One very strong point in favor of the reflex is that the most can be made of the distance available between the sitter and the lens, as the reflex does not require any space to be allowed for focussing; in fact, the back may actually touch the wall or any other object which bars the way. It is also very convenient to be able to dispense with a tripod indoors, and to use instead any articles of furniture which may be suitable, although we do not suggest that the tripod be left at home. It will be found that better results will be given by exposing with the mirror if the construction of the camera allows this to be done, since focal-plane shutters are rarely silent when used for "time" exposures. If exposure by the mirror is not possible a small flap shutter can be fitted outside the lens; this will protect the plate while the mirror is being raised, the slide being drawn before or after focussing as circumstances demand.—*B. J.*

The Negative

It comes somewhat as a shock, occasionally, to listen to the confession of a photographer of many years' standing that he does not understand why he does not get satisfactory prints when he is making such fine negatives.

The testimony of almost all of the most experienced printers is unanimous in the positive statement that when a negative is perfect in quality the prints can be made equally as good with the least trouble. In fact we have heard the statement asserted in the broadest general terms, that from perfect negatives the prints just came perfect of their own accord and that no particular skill was required. It is the poor negatives that need the greatest skill and care and experience.

If this is true, and we have seen enough proof of it to believe that it is true enough to establish a rule, then the alternative is that the negative is not as good as the photographer thinks it is. That he is either deceiving himself or is deceived by the negative. The solution of the difficulty, therefore, resolves itself down to the ability to distinguish a good from a poor negative.

Occasionally we are gratified by hearing from the lips of a careful, experienced photographer the statement that every now and then he gets a perfect negative and is just beginning to learn what a perfect negative is.

How can the knowledge or the skill necessary to know a perfect negative when we see it be acquired? If it were easy, every one would learn it early in his career and there would be no need of plate demonstrators or paper demonstrators. But it is not easy and it does require experience and study to gain it. We may know that the quality is poor if the printer has trouble in getting a brilliant, clear picture. If he has to fake here and dodge there and then is compelled to acknowledge there is something peculiar about the result, the place to look is at the negative. But occasionally there comes a negative which prints easily and with all of the detail and brilliance that we so much desire, and right there is the opportunity to become acquainted with quality.

Real quality. Perfect quality. The quality that we wish that we could get in every negative. The quality that makes the printing and the finishing and the delivery a joy and a pleasure.

That negative should be most carefully analyzed as to color, depth of development and balance. The problem becomes merely one of duplicating the factors with regularity and certainty. But it demands no little thought and attention to detail to learn how to get them every time, for it means that precision must be attained in every step from the lighting of the subject to the final washing of the negative. And the result, when compared to our standard of perfection, may show some variation, or it may look like it, and yet may not print up with the same ease and snap. Possibly the eye has not yet become sufficiently trained to see the reason for the difference, and a careful analysis is again necessary to find out the very necessary whys and wherefores.

But instead of depending on judgment and appearance, in reality the easiest method is to adopt the careful and methodical machine-made negative. The happy-go-lucky workman and the professional wise guy can never get anywhere with a mechanical process, for he is either too careless to be exact as to measurements and temperature, or else he knows so much more than other people that he does not have to follow rules and directions.

It does no good to spend time with such workmen, for they can not be taught. They are not confined to any one class of photographers, for they live in the large cities as well as the small towns, and are just as frequent in the lavishly decorated studios as in the plain country gallery. Judgment is fallible and is often merely a high-toned term for guesswork. Even eyesight is variable, and even in these balmy days of national prohibition the eye does not always see straight.

There are rules offered by the plate and paper manufacturers that they are begging the users of their products to follow, but with doubtful success. They have the soundest of reasons for wanting, and of spending real money, to show how to obtain perfect negatives with regularity and certainty, but they find opposed to them a skepticism or suspicion that is very difficult to overcome and that requires the utmost tact and diplomacy to get around. Useful information has to be sugar-coated and garnished with bribes. Sound sense has to be camouflaged with entertainment. Direct and positive instructions have to be tempered with honeyed words and abject apologies. Probably the quickest way to drive a customer to another brand of paper or plates is to prove to him that he does not know a good negative when he sees it, even if it is the everlasting-world-without-end truth.

A negative that is blue in tone may look ever so perfect to the eye and be a thing of beauty in itself, and yet yield a muddy mess that will ruin any photographer's reputation. The same exposure properly developed to a delicate amber will make a reputation and a satisfied customer. When you come to a realization that you do not know what a perfect negative is and do not know how to develop a plate so as to get perfect printing quality, ask the demonstrator when he comes around and listen meekly to what he has to say. Perhaps he has had experience and breadth of information that enables him to know one or two things better than you do. He may not know it all, but it is a hundred to one shot that there are a lot of things you can learn from him for your own profit if you will give him your undivided attention.—*Trade News.*

Photographing Motor Cars and Machinery

ENGINEERS are very exacting people to work for. They are trained to precision, and they expect those who work for them to be as accurate and as painstaking as they are themselves. Unless you appreciate this thoroughly you will be wasting your time in attempting photographic work for engineering firms.

An engineer wants clear, sharp photographs with all the detail plainly shown. He expects you to set aside all your ideas of picture-making. Broad masses of shadow where the detail is suppressed will only irritate him. He wants photographs that will help a prospective customer to visualize a motor car, an engine, or a piece of machinery. A little cam, a spindle or a worm-screw will not seem important to the layman; but it may be a new invention, and in the eyes of the engineer the most important part of the machine. Your photograph must back up his specification.

Motor cars are less difficult to photograph than machinery. They are portable, and it is therefore easy to get them placed in the best light and with the most suitable background. This, of course, refers only to finished cars. When engines or other separate parts have to be photographed, they require the same treatment as machinery.

Before you photograph a motor car, get to know in what respects it differs from other motor cars. Find out its selling points, because you may be pretty certain that the maker will want them shown to the best advantage. You should also ask whether the photographs are to be used for general advertising or for catalogue illustration. If they are wanted for general advertising, you can make them more telling by taking them on an open country road with a good stretch of scenery for a background. If they are wanted for catalogue illustrations, a plain background is best.

This work nearly always needs blocking out. Choose a gray day or work in a shady place. The polished surfaces will give you endless trouble if you attempt to photograph in sunlight. A panchromatic plate and a "K" filter are necessary. Without them your color values will be ridiculous, and the photographs will probably be thrown back on your hands. Above all, use a long-focus lens—the longer the better. If you attempt the work with a wide-angle lens in a confined space, you will get distortion; and, remember, distortion worries an engineer more than it does most people.

Machinery is a tough problem. Small machines or separate parts of large ones are easy enough to deal with; they can be placed on a bench or table in a good light. You will find, however, that most of your photographs will have to be taken when the machines are fitted up in their working positions. Here, as a rule, you have a poor light, a confined space for working, and an object with some parts shining like so many mirrors and other parts painted a deep green, red, gray or black.

Generally you can do a great deal toward reducing the harshness of the light by a liberal use of a cheap material like butter muslin. Light softeners, however, must be used in the right way; otherwise they are worse than useless. Suppose, for instance, that you have to photograph a machine in a room where there is only one small window. Unless you have had experience, you will probably tack muslin over the window and imagine you have done all you can to soften the light. As a matter of fact, you will have done little or nothing toward reducing the contrasts. You will have made it necessary to give a longer exposure, but that is about all. The way to go to work is to use the muslin exactly as you use a head screen in the studio. Hang it up between the machine and the window, as near the machine as you can without letting it show in the photograph. This allows all the light to come into the room, and softens only that which falls directly on the machine. There is as much reflected light as before, and so your shadow detail is not lost.

In addition to softening the light, much can be done to reduce contrasts by toning down the polished surfaces and lighting up the dark parts of the machine itself. You can do this, of course, only when you have the engineer's permission. As a rule, he is only too pleased to help you in any way; indeed, he will often go to the expense of having a machine specially painted when the advantages of this are pointed out to him beforehand.

There are two very good "non-shine" paints, both of which can be removed easily with turps when the photographs have been taken. The first is made by mixing equal parts of fine cement and stone dust with linseed oil to the consistency of ordinary paint. The second, which is easier to apply, should be used when there is much metal to cover. It is made by thinning white lead with turpentine to the consistency of cream and then adding a little lampblack, just enough to dull the white. To five parts of this mixture, one part of gold size should be added to make it stick.

When painting cannot be done, you can reduce the contrasts by dabbing the bright parts with putty. The dark painted parts may also be dabbed with putty and then dusted with powdered chalk.

The floor of a machine room is generally dark and oil-stained. It will help the shadows if you cover the floor with newspapers, under the machine, and round it to a distance of four or five feet. Another useful dodge for picking up the shadow detail is to use a mirror for reflecting light into the dark corners. The mirror can be held in the hand while the exposure is being made, and the light directed to bits of detail which are half hidden in the shadows.

When a machine is lighted from two sides, it is best to block out one of the windows. Cross lights destroy the relief in the rounded parts; they give double high-lights and confuse the detail.

The most trying subject of all is a machine which has to be photographed against the light. The best way out of the difficulty is to block up the window, or wait until night, and then make your exposure by flashlight or magnesium ribbon. There are occasions, however, when the photographs must be taken by daylight, and when you are compelled to make the best of what light there is. In cases of this kind a mirror is very useful for reflecting light back to the dark side of the machine.

The background in a machine room is usually a confused mass of belts, shaftings and other gear. Unless you hang up a white sheet behind your subject, you will find great difficulty in picking out its various parts when you come to block out the negative.

With regard to exposure and development, you will find that the best results are secured by giving a very long exposure—one that would in ordinary work amount to excessive overexposure—and by developing with half, or less, the normal quantity of carbonate of soda in the developer.

Blocking out on the negative must be done very carefully. This is not an easy task where there are many intricate parts to contend with. Opaque is a good substance to use. It is easy to put on and it does not peel off when dry, as so often happens with indian ink. To get clean edges you must go over the outlines with a ruling pen; and be careful not to use the brush until you have done this. For outlining axles, uprights, or any parts with straight lines, use the pen and a straight edge; and for curved parts use an architectural curve instead of the straight edge. Architectural curves may be bought for a few pence at any artists' material shop. After you have gone over all the outlines with the ruling pen, it is then quite easy to work up to the lines with a brush.

It is important to remember at every stage that nothing but the best work will satisfy an engineer. His whole education and professional training have made him accurate and exacting in a high degree; and he expects as much scrupulous care from others. You must be prepared to find these good qualities sometimes carried to an extreme. The writer remembers once submitting a mounted 15 x 12 photograph to a director of one of the largest engineering firms in the country. This man had the instinct for precision so strongly developed that, as soon as he took the photograph in his hands, he said, "*It is not mounted square.*" Sure enough, when the rule was applied, it was found that there was one-sixty-fourth of an inch more plate mark showing on one side than on the other—a fault that would never have been noticed by any ordinary man. Here was a man, however, who had been trained throughout a long life to working to a thousandth part of an inch; and the want of exactness in the mounting worried him so much that he could hardly bring himself to consider the photograph at all.

That was an extreme instance, of course. Speaking broadly, engineers are seldom unreasonable. Indeed, you will generally find them ready to help you in every way possible. Their technical and practical experience makes them more ready than other commercial men to appreciate the dfficulties under which you may be working. If the conditions are so unfavorable as to make it impossible for you to take a satisfactory photograph of a piece of machinery, it is always wise to explain the position frankly to the engineer in charge—and his practical mind will almost invariably hit upon some way out of your difficulty.—*Professional Photographer.*

VIEWS AND REVIEWS

The Southern School of Photography

Post-graduate review for professional photographers by Daddy Lively at the Southern School of Photography, McMinnville, Tennessee, of two weeks, beginning August 30. Photographers who have attended previous reviews, without exception, are enthusiastic over the benefits received. A post-graduate certificate will be presented each professional student.

"New Mexico"

The author of this book, Dr. George Wharton James, is the well-known explorer, lecturer, and author of *California, Romantic and Beautiful; Arizona, the Wonderland, etc.*

For practically thirty years he has been studying this field. He is fully familiar with it in all its phases and various stages of development. He is a member of a number of the Indian tribes, and on the other hand he is a close student of the elements of the State's highest culture. Every beneficial interest in the State has received full and candid presentation at his hands.

Chapters on: Its Ancient Cliff and Cave-Dwellings and Pueblos; Its Conquest by the Spaniards; Its Franciscan Missions, which surpass in romantic interest those of California; Its Scenic Marvels; Its Antiquarian Fascinations; Its Sedentary and Nomad Indians, with personal accounts of their Ceremonies, Games, Social Life and Industries; Its Historic Inscription Rock; Its Self-whipping Flagellants; Its Geology, Flora, Birds and Hunting; Its National Forests; Its Rivers; Its Gigantic Elephant-Butte Dam and other Land-Reclamation Projects; Its Healthful Climate; Its Rapid Develpment; Its Fine Educational System; together with full and accurate accounts of its most progressive counties, cities, towns and communities.

Large 8vo, handsomely bound in silk cloth, with twelve plates in full color and forty-eight full-page illustrations in duogravure. Boxed, net, $5.00, carriage paid $5.35. Published by The Page Company, 53 Beacon Street, Boston, Massachusetts.

"The Photographic Researches of Hurter and Driffield"

Being a Reprint of their Published Papers; a History of their Early Work and a Bibliography of the Later Work on the same subject. Edited by W. B. Ferguson, K.C., M.A., F.I.C., F.R.P.S. Quarto. 374+xii pp., 100 Illustrations; Portraits; Index; Buckram binding. Price, $9 postfree.

This volume marks the culmination of the efforts of the Royal Photographic Society to establish a memorial to Hurter and Driffield, and here for the first time all the important papers of these two pioneers in the application of science to photography have been collected together in a convenient form and in chronological order. Consequently the interest of this book is not only scientific but historic, and as these papers are scattered throughout the chemical and photographic literature in a most haphazard way the advantage of having them together in one volume may well be realized. It is noteworthy that although more than twenty years have elapsed since Hurter and Driffield devised their system of sensitometry, and although later work has rendered the validity of many of their assumptions doubtful, their methods are employed substantially unchanged at the present day.

The reprints of these papers are preceded by an article on the early work of the authors, which must have involved the editor in a very laborious study of the original manuscripts, now preserved in the rooms of the Royal Photographic Society, and this introduction not only explains the early ideas of Hurter and Driffield, but also makes the succeeding papers much more easy to follow. In addition to the reprints themselves, the volume also contains the criticisms of the authors' views which were made at the time by Abney and others, and their replies, thus providing a complete account of the growth of the science of sensitometry and such closely allied subjects as photometry and actinometry.

The papers are too numerous to mention in detail, but in particular Hurter and Driffield's paper, first printed in 1890, is now almost a classic, as it placed photography, up to this time carried on largely by rule-of-thumb methods, upon a firm scientific basis and opened the way for its future advancement. Following this reprint is a series of papers on photometers, the theory of photographic reproduction, the latent image, etc.; and the work concludes with an exceedingly valuable bibliography of all the more important papers which have been published upon physical and chemical problems bearing upon photography, which alone would prove invaluable to workers in this field, and which, combined with the complete history of the subject in the body of the work, provides a valuable addition to photographic literature.

Published as a memorial volume by the Royal Photographic Society of Great Britain, this work is perhaps the most notable book on photography published since the appearance of Hunt's classic *Researches on Light* in 1844. Indispensable to students of the photographic process and to all engaged in photographic research.

Address orders to the American Agents, Tennant and Ward, 103 Park Avenue, New York.

The P. A. of A. and the Women's Auxiliary

At the meeting of the Board of Directors of the P. A. of A., at Toledo, Ohio, changes were made in the regulations for the Woman's Auxiliary as follows: No dues are to be collected, each woman who attends the National Convention may become a member of the Auxiliary by signifying her desire to do so, and by the payment for the button which admits her to the Convention Hall.

The disposal of the dues which have already been collected will be decided at the Milwaukee Convention. As a fund for the care of the rest rooms and for the entertainment of ladies attending the Convention will be provided by the P. A. of A. and the manufacturers and dealers, the Board decided that there is no need for the payment of dues into the treasury of the Auxiliary.

Alice W. Chambers,
Secretary.

"Pictorial Composition in Photography"

By Arthur Hammond. Issued through American Photographic Publishing Co., Boston, Mass. Price, $3.50, net.

"To the making of books there is no end." The wise ancient who wrote this was a little too previous or he would have added, probably, the clause, "especially on the subject of composition in pictorial photography." It may be asked, therefore, Why was this book written ? One good reason that occurs to us, among others, is that there is such a lamentable amount of ignorance of this subject in America, even among some pictorialists with reputations—however they get them! If the other books that have appeared have failed to redeem them, it may be that the sermon Mr. Hammond's work delivers may reach them, find a lodgement, bring them to repentance and salvation and cover a multitude of sins!

The introductory chapter of thirty-two pages may be found tedious and superfluous by those already familiar with the subject; but the others will rejoice that they are getting the worth of their money, which is so surprising in these degenerate days!

Then we are brought face to face with the discussion and suitably introduced. It will be found, necessarily, that the contents of the volume is a winnowing and an epitome of all that has been previously written. In fact, only the absence of quotation marks, in some passages, has prevented us from thinking we had taken up the wrong book. But the author has infused his subject with so much of his own personality and style, and besides including some new matter, it will be found quite original and commendable. The volume will be found instructive to the novice, and serve to recall to the initiated knowledge of the subject previously acquired but now forgotten or transgressed.

The book is excellently printed and issued, and the publishers are to be congratulated on their achievement and success in the present times and circumstances.

The feature that should most engage and be admired is the illustrations. While there is, here and there, one that leaves much to be desired as an example of the principles enumerated, for the most part they exemplify excellently all the author seeks to teach. They are better far than some of the originals we have seen in exhibitions.

We recommend this book to all who are interested in the subject of which it treats; and we predict and wish for it a large and continued sale.

British Pictorialist at The Camera Club

Bertram Cox, F.R.P.S., of London, England, has sent an exhibit of his pictures which will be on view at The Camera Club, 121 West 68th Street, New York, during the month of September, and possibly before. These will be exhibited free to the public.

Mr. Cox is well known throughout Europe and to many in this country. His process is bromoil and, as an artist, he ranks among the best. We advise our readers not to miss this exhibition.

Portraiture at The Camera Club

The exhibition for July at The Camera Club, New York, consisted of portraiture. It compossed the work of Rabinovitch, No. 25 West Fiftieth Street, New York; and it was well attended and greatly admired.

The portrait of Mrs. McNealey was a remarkable example of camera art, full of character and expression. All the emotions of a lifetime seemed depicted in the kindly features, even the mental experiences could be seen in the expressive eyes. It was truly the rendering of a lovely and loving character.

As a contrast, alike in key and age, was "Mabel Pleahette." It was like a sketch, light and toneful, displaying the charm of youth and beauty most artistically conceived and executed.

"The Spirit of Old Grenada" really embodied the spirit, for the model must have been a child of old Castile. The lines and action of this figure study will set an example worthy, if difficult, of imitation.

Also deserving of high praise, we should mention "Esta Varez," the study of a head, in broad masses, very strong, and well worthy of the unusual type and beauty of the subject.

Other portraits, etc., to be highly commended ware "Lee S.," "Girl in Black," Rose Heller," "B. H. W.," "Emily S.," "Dr. H. T. Kahn," "Joseph Meltzer," "Doris" and "Matilda L."

In the space in the galleries, always reserved for members' work, were some excellent portraits from the skilled hands of that well-known camara artist of the movies, Mr. Ned Van Buren. Among the galaxy of seven stars portrayed were Misses Doris Kenyon, Pauline Frederick, Lorraine Harding, *et al.*, and reference must also be made, as among the best, to "Miss M.," "Miss Helen McDonald," "Mrs. Dill," and "Girlhood," the latter a delicate and beautiful picture of a sweet, young girl.

There will be an exhibition of members' work at The Camera Club, 121 West Sixty-eighth Street, during the month of August.

Dyes for Photographic Plates

At the last meeting of the American Astronomical Society, Miss Florence J. Stocker reported on the progress made by American chemists in producing dyes for use in sensitizing photographic plates to various portions of the spectrum. The dyes used in sensitizing to the green, red and infra-red are of the types known, respectively, as pinaverdol, pinacyanol, and dicyanin. The U. S. Bureau of Chemistry has produced a pinaverdol which is somewhat superior to any German or English green sensitizer, and a pinacyanol which is practically the same as German pinacyanol and English sensitol red. The same bureau has produced several dicyanin dyes which are only slightly inferior to those of German make. Recently the Bureau of Chemistry has submitted to the Bureau of Standards for testing a new type of dye, called kryptocyanin, a sample of which has been found to give a very pronounced narrow region of photosensitivity from 7200A to 7700A. This may prove of great importance for spectrum photography.

—*Scientific American.*

New York Photographers to Close Their Studios on Fridays in Future

On the initiative of the Professional Photographer's Club of New York, Inc., at a meeting of members as well as non-members, a resolution was passed to adopt Friday as a "Day of Rest."

To get the general consent of a majority of the city photographers a vote was taken by mail, with the result of a majority voting for the closing of the studios on Friday. Some are in a position to close on Sundays and they prefer that day. This is the first attempt of the Professional Photographers' Club to accustom the photographers of New York to keep their studios closed one day in the week.

E. Chait, Secretary.

"Organic Photographic Developers"

This book contains an exact copy of all the patents issued since 1882, including British, French, German and United States, arranged in chronological order. To these there is added a compilation of abstracts from various academic journals as originally contributed by such distinguished chemists as Anderson, Bayer, Baum, Gatterman, Grandmougin, Hauff, Lumiere, Seyewetz, and many others. There is also added a collection of chapters upon kindred subjects such as Developing, Factorial Development, Bleaching and Intensification, Direct Positives, Toning, Dye Sensitizers, Diazotype Process, Chemical and Physical Characteristics of Developers, List of Developers, etc.

The book was written for the practical photographer and chemical manufacturer and contains many processes and formulas that will bë found useful by them in the conduct of their business.

Of Interest to Women

Why the P. A. of A. wants the Auxiliary, and why the Auxiliary wants You

The woman who is a photographer, or who is engaged in photographic work whether as receptionist, retoucher, or as a manufacturer or dealer in photographic supplies, knows the value of the organization and the pleasure and profit gained by attending the Conventions, and it needs little urging to bring her there year after year. To the woman who knows her husband's work, just as the public does, but heightened by her personal interest in him and his work, there is much to be said. She does not need a technical knowledge of photographic work to help him; she can see and appreciate his work from the viewpoint of the public and can interpret to him just what the public wants; therefore, the conventions will mean as much to her as to her husband. She will review the work of the photographic world and will learn to discriminate between the different classes of work. There will be two minds at work for their mutual advancement. Things he may miss she will see. There is no other profession where the wife can be of as much assistance to her husband without the need of technical knowledge, and there is no other profession in which those who have "arrived" are so ready to help the man who is on the way.

The National Convention wants the photographer, the manufacturer and the dealer. The Auxiliary wants his wife, mother, daughter and sister. Aunts and cousins are also welcome. You all have ideas and can help the Auxiliary. At the same time you will get a broader knowledge of photographic work, and the best holiday and the best return in every way for the money and time it will cost you.

Alice W. Chambers,
Secretary.

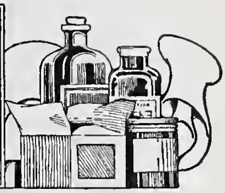
The WORKROOM

CONTAINING THE LATEST PROCESSES, FORMULAE AND APPLIANCES NEEDFUL IN THE ART OF PHOTOGRAPHY FOR THE OPERATOR & WORKER

Efficiency in the Workroom
Distinctive Warm Tones Direct
Leaves from my Note Book
Sepia Tones
Auramine as a Sensitizer
Green Tones
Grain in Negative Making
Milky Fixing-Baths
Dampness and Faded Prints
Stripping Paper
Photo-Filigraine
Restoring Old Paper
Varieties of Lenses and the Work for which Each is Fitted
Color Sensitizers for Two-color Photography
Methods of Coloring; Print-out Formulas
Repairing Blisters in Enlargements
Two Useful Cements
The Art of Negative Making
Making Enlargements from Film Negatives
Fumes and Dampness
Photographing Materials and Processes
Patent News

THE WORKROOM

By the Head Operator



Efficiency in the Workroom

There are too many photographers today who pay insufficient attention to workroom efficiency. Some kind of system has to be observed in the office and reception-room, but so long as the photographs come through eventually, little thought is given to the methods employed in the workroom.

The processes necessary to the correct evolution of a picture from dark-room to client are many, and our opportunities for increasing the efficiency of working conditions are correspondingly numerous.

In producing photographs—whether in large or small quantities—in "popular price" work, or work of the highest artistic value, system, applied to the methods employed, will be found a wonderful asset to every photographer who strives after success.

No business can derive a maximum benefit without it, and the more this efficiency is incorporated in our workrooms today, the greater will become the capacity of those studios, their output will be larger and better, and an all-round improvement will be the result.

I am not propounding something new. Everyone of us realizes the obvious truth of these facts, yet how many of us apply them to the everyday routine of a modern studio?

I am talking to you today against my own inclinations. I realize that I could learn from so many of you here much more than I am able to teach. But those in authority at this convention have been good enough to consider that our workrooms are conducted on a system which is helpful, and also that we have in those workrooms a few original ideas which ought to be spread broadcast among photographers, hence my appearance here.

I have no doubt that before this convention is over I shall find that my original ideas are also subjected to that old saying, "There's nothing new under the sun." But my efforts are simply directed toward showing what big time-savers and efficiency-makers I have found these ideas to be, and it's immaterial who discovered them.

Before I proceed further, let me suggest that if we spent more conscientious thought on the arrangement and conveniences of the printing-room, 50 per cent. of the photographer's troubles would be automatically removed. I have heard it repeatedly asserted by men who ought to know, that a good printer is as important an asset as any man in the studio; if this be so, then the room he works in should be treated with equal importance.

The old fallacy that a printing-room must necessarily be a dark-room has long since been exploded. Plenty of light is permissible, provided it is safe light, and with light, cleanliness will become an easier accomplishment.

To return to the printing-room. Emphasis ought to be laid on the fact that there is little or no lost motion, that each consecutive process follows the other in direction as well as order. The shelves for storing paper and the cutting bench come first, then the printing machine with negatives in order above it—negatives for enlarging, negatives for contact printing, and all negatives finished and awaiting filing. On the right of the printing machine is the up-to-date enlarging machine, while the lenses used in enlarging are kept in one section of a sectional bookcase, free from dust and danger of breakage. The developing tray follows the printing—stop bath, fixing, and the large washing tanks complete this "circle of motion."

The subject of printing could well occupy a talk all its own and still remain inexhausted, but I am just going to touch one phase of the question which ought not to be lost sight of. I refer to the "doctoring of negatives." What volumes of profanity must have been used to express the thoughts of printers toward the poor operator. Yet it is not always the operator's fault. I make hundreds of the negatives I print, and if those negatives came direct from the dark-room to me, and I was in the habit of using a profane vocabulary, I am afraid I'd often be indulging in the pleasant occupation of cursing myself. Negatives as soon as they are ordered should be returned to the dark-room for careful examination, and a few minutes' work with reducing agent or intensifier, local or general application, will save the printer hours of dodging, and attain a result which no amount of printing can reach. Careful dodging will also give the printing papers a fairer chance. Too many photographers expect the various developing papers to give wonderful results irrespective of the quality of the negative, entirely forgetting the fact that papers can only register what is in the negative.

While on the subject of the printing-room I want to offer a few hints upon little necessary items which are incidental to printing. Let me here explain that these little ideas are not all original, some of them have been handed to me in the hope that they would be helpful, and I pass them along to you in the same spirit with the assurance that I have found all of them very useful.

For cleaning the back of a negative before printing, the sanitary and best way is to put a little pulverized pumice in a piece of coarse-weave flannel cloth. A slight rubbing, without moisture, is sufficient to clean the negative, and, if the neagtive is very dirty, breathing upon it and then rubbing with the pumice pad will be found sufficient.

A good system of lighting a printing machine is to use twelve 60-watt lights for 11 x 14 size opening, instead of four higher power ones. Supposing your negative is not evenly balanced, and the thin section of it lies over light No. 9, break the contact on that light by unscrewing the bulb, and you "even up" your print; or, *vice versa*, if you have a dense section just insert immediately under it a higher watt—say 75 nitrogen—and in most cases it brings the desired result. I have found this system very efficient in saving time with tissuing, etc. The reason for so many lights is to enable the printer to localize the corrections better.

Many studios make a speciality of combination prints, four or five on one sheet of paper. I have found by using portrait films for the negatives that they can be cut down, fastened to one piece of glass, vignetted, and printed under one exposure instead of having to vignette and print each negative separate, which is a tedious process at the best.

In making enlargements one sometimes runs across a negative that is too dense to focus correctly. A simple method to overcome this difficulty (which probably most of you adopt) is to get the approximate focus, then insert a thinner negative, get the final focus, and replace the negative you wish to enlarge, and then expose.

Many a time a printer will pull the black envelope out of the outer covering of a dozen sheets of paper. There may be other black envelopes lying around, and confusion as to what grade of paper they contain will be the result. To avoid this purchase a white pencil and mark the grade on the black envelope as you open it: the pencil mark can easily be detected in the dimmest light.

Before proofing your negatives, number the glass side of them with a negative grease pencil. Then, if two negatives are very similar in position you will have no difficulty in telling which one the customer has chosen when the proofs are returned.

If one has to print an artist proof sheet from a subject that is not in the center of the negative, one can get a little more latitude in width by moistening the finger with a little opaque and running it along the edge of the negative. This will enable one to print to the edge of the negative without getting a black line.

There are various methods of making a diffused print from a sharply focussed negative. I much prefer the result obtained by the following method: Roll your developing paper with the emulsion side in until it stays with a reasonable curve; place in position upon the negative, and hold firmly in contact with the tips of the fingers of one hand. Now start the exposure, and with the other hand gently press paper in contact with the negative, allow it to recoil as soon as it touches, and repeat the operation for about one-half of the exposure; complete the rest of the exposure with the paper in absolute contact with negative. It sounds a bit complicated, but in practice is very simple, and gives a result that is very pleasing.

Absolutely the best method I have found for cleaning discarded negatives is to leave them overnight in used pyro-soda developer. In the morning you will find that a rinse in cold water is all that is necessary to give you the clearest and cleanest glass obtainable.—HERBERT G. STOKES, in *B. J.*

Distinctive Warm Tones Direct

THE work of a successful portrait photographer has invariably some peculiarity or distinguishing characteristic which stamps it as something not just the same as the general run of portraits. As an aid to secure this distinctive note, "warm black" or "engraving" tones have been largely adopted in place of the commoner cold black and sepia. The production of these warm black tones has meant in most cases the use of a slow development paper specially suited to give the required results, and with a few exceptions the warm blacks as produced are confined to a very limited range.

Therefore we may show how the idea of producing warm tones direct might with advantage be simplified and extended. In the first place, while not denying that special papers have individual qualities, we would point out that these tones can be produced on almost any developing paper, though, of course, some are easier to work than others. Most bromides can be used, but (ignoring for the moment specially made papers) the easiest method, and one giving a very wide range of effects, is one using ordinary vigorous gaslight paper. This type of paper, if worked on a certain simple and definite system, will give prints of any color from black, through rich brown to brick red. With good brands of paper the tones obtainable are of excellent quality, and the browns are superior to the usual results of secondary toning.

The system depends on good negatives, excessive exposure, and restrained development. The most important factor is the negative, which must be good. For warm blacks it can be soft or even a trifle flat, but for browns, and particularly for reds, the negative requires to be bold, clean cut and definite; the sort of negative that without being harsh or dense would suggest the use of soft bromide and full exposure for a black print. A strong light-source is wanted if exposures are not to be too prolonged. The warmth of the tone depends on the amount of exposure, or perhaps we should say overexposure, for all exposures in this system must be generous.

Obviously, a normal developer would be useless with overexposure, therefore the developer must be diluted and restrained. The strength of the solution and the amount of restraining necessarily vary with the character of the negative, the kind of paper and the color required. The following formula is about right for the average case:

Metol	10 grs.
Hydroquinone	30 grs.
Soda sulphite	$\frac{1}{2}$ oz.
Soda carbonate	$\frac{1}{2}$ oz.
Potass. bromide	12 grs.
Water	20 ozs.

The method of printing differs from the usual. In ordinary black-and-white work one aims at accuracy.

Leaves from my Note Book

In removing silver stains from negatives I have found the preparation made by the following named formula to give very satisfactory results:

Lead nitrate	2 drs.
Hypo	2 ozs.
Sodium phosphate	5 gr.

Dissolve in 6 ounces of soft water and then add 2 drams of alum. Set aside until well settled; use the clear liquid.

I find that this tones the stains away and clears and brightens up the negative considerably. It requires about one hour to remove bad stains of long standing. After the stains have disappeared the negatives are washed and dried in the usual manner.

I have found it easy to revive leather or leather imitation coverings of cameras by the use of the reviver made according to this recipe. This makes about one quart.

Oil of turpentine	½ oz.
Sperm oil	3 ozs.
Acetic acid	3 drs.
Glycerin	3 drs.
Methylated spirit	2½ ozs.
Whites of 3 eggs	

The oils, acid and glycerin are gradually added to the eggs, an egg beater being used to mix them thoroughly. Then the mixture is put into a quart bottle the methylated spirit diluted with its own volume of water is added and enough soft water poured in to nearly fill the bottle. Next 100 grains of aniline dye of the desired color are added and the bottle given a good shaking. In using it is well rubbed into the covering with a piece of flannel cloth.

Here is a very simple method of washing films. When the film is taken from the fixing-bath rinse it well and bend it face inward into the form of a half cylinder and secure it so with a loop of thread. A number of negatives may then be placed side by side like the arches of a bridge on the bottom of the washer. If there is room for them a second row may be placed by the side of the first and if the tank is deep enough another batch may be stood crosswise on the top of the bottom layer. When the water is admitted to the tank it will circulate round and between the negatives, washing them thoroughly.

In making photographs of interiors I focus in the following manner, which produces results superior to those obtained in the usual way: After having determined the nearest and furthest point which the lens will depict in the picture I bring it at full opening to its sharpest focus on a point situated at one-third the distance between the nearby and the far-off rooms and not midway between these two points. The lens is then stopped down until the furthest point shows with the required sharpness and definition at which exact moment the nearest point will also be defined with the same degree of sharpness. When focussing at middle distance it is necessary to use a smaller stop in order to secure the same sharpness for nearby points, thereby unnecessarily increasing the exposure without any corresponding gain in definition.

Recently I made a number of bromide prints some of which had ample exposure but too much development, and I remedied the overdeveloped prints in this way: I made a 10 per cent. solution of iodin in methylated spirit, and also a 10 per cent. solution of potassium cyanide in water. To every ounce of water I added 15 drops of the iodin solution and 30 drops of the cyanide solution. After the prints had been fixed and washed I flowed this mixture over them and removed them from the solution before they were quite as far reduced as I desired and rinsed them thoroughly in water.

The following is a good method of removing the emulsion from negatives. The negative is first washed well in water and then put for five minutes in the following bath:

Commercial formalin	7 drs.
Glycerin	3 drs.
Water	8½ ozs.

After this bath the negative is dried, the edge of the film is cut round and the plate placed in the following soda bath:

Soda	6½ drs.
Water	3½ ozs.

Then without washing the plate is transferred to a solution of hydrochloric acid 4 drams, water 3½ ounces. The film leaves the plate at once and floats on the surface of the water. After a short washing in clear water it may be floated on to a new support.

In photographing waterfalls rapid plates are better than slow ones because, as a rule, waterfalls have dark banks, so that there is extreme contrast and rapid plates minimize this. On the other hand, to obtain sharpness in the falling water and detail in the dark banks, in the first case a short exposure is necessary and in the latter a long one, so that if all is to be obtained on one plate generally a little of both has to be sacrificed. It is best to use two plates, one for the falling water and the other for the banks, and if care is exercised so that the camera is not shifted between the exposures it is very easy to print from the two negatives, masking out the banks in the water negative and the water in the banks negative.

The following is a simple method of transferring photographs to postcards, china, glass for crystoleum painting and similar articles: Having made and developed a print, fix in a hypo bath containing a good proportoin of alum, and wash well in tepid water. The while the print is lying under water at the bottom of the vessel, start to dislodge the film at one of the edges by rubbing inward lightly with the finger-tip. This causes the film to frill and leave the paper. When loosened for about a fourth of an inch along one edge, lay a very thin strip of wood on this so as to catch the edge of the film between both pieces. This done, lift the whole thing out of the water, and, holding both pieces of wood between the finger and thumb of the left hand, catch the stripped edge of the paper with the right thumb and forefinger and pull away gently. The two pieces of wood form a clip and hold the edge of the film, and on the paper being pulled away the film strips completely off. Replace the film in the water and float it on to a piece of strong paper or thin cardboard with the picture side against the side of the card. Remove from the water and allow to drain for a few minutes. In the meantime prepare the surface to receive it, by giving it a very thin coat of starch paste, which leaves no gloss, and on this surface lay the cardboard film down and press well. Remove the cardboard and it will be seen that the film has become attached to the surface. Allow to dry well, and then, to trim up, pass the point of a sharp penknife lightly around the edges to cut just through the film. Slightly moisten the parts of the film outside the trimming mark with a piece of cotton soaked in water and by lifting a corner the strip to be removed comes off quite easily.—William Underwood.

Sepia Tones

It is pointed out that there are two extremes to be avoided—the foxy yellowish brown, bad in color and lacking in strength, and the heavy brown in which all the transparency of the shadows has been blocked up. There are two methods of obtaining these tones—the two-step method of bleaching and then sulphiding, and the single method with hypo-alum or liver of sulphur. In the former it is difficult to gauge the tone, because one has the sudden jump, whereas in the single-bath method the transition of the tones is gradual and easier to control. The solutions are cheaper to compound, take less time in working, and with suitable papers yield a full range from warm black to sepia. It is a well not to use the solution at too high a temperature; although cooler solutions take longer, the tones are more under control. Those who prefer the two-solution method will find that cooler browns are obtained by giving the prints a preliminary soaking in the sulphide solution before bleaching, the usual procedure being followed after bleaching. It is not generally known that bleached prints may be dried and kept for days before sulphiding.—*B. J.*, 1902, p. 210.

Auramine as a Sensitizer

Bloch and Renwick state that auramine when used with the isocyanines considerably increases the red sensitiveness of the plates, gives greater speed and freedom from fog and increases the life of the plates. It can be added to the emulsion or used in conjunction with the isocyanines for bathing, and in the latter case about 2 in 50,000 of solution should be used. English, French and American patents have been issued for this.—*Phot. Journ.*, 1920, p. 145.

Green Tones

A formula was recently given in an American journal for obtaining green tones by sensitizing paper with bichromate and magnesium sulphate, exposing under a negative and then developing with pyrocatechin. If anybody works from this formula they will be disappointed; this is nothing more than a misprint and the process was suggested by Weissermel (*Phot. Mitt.*, 1907, 490). A good paper should be sized with a 2 per cent. solution of gelatin and dried and then sensitized with:

Potassium bichromate	30 g
Manganese sulphate	50 g
Water	1000 c.c.

This can be freely applied with a broad brush or a swab of absorbent cotton. The paper must be dried in the dark and rather overprinted, till all the details are seen of a brown color on the yellowish ground. After exposure the print should be washed for two or three minutes till the whites are clean and then surface moisture blotted off and the surface swabbed with a 10 per cent. solution of pyrocatechin, when a fairly bright green color is obtained, washing for about five minutes and drying rapidly in front of a fire will complete the job.

Grain in Negative Making

A certain amount of grain will always show whatever developer is used for developing a wet or dry plate. The slower the development the finer the grain. An experimenter wishing for the finest grain with wet collodion, might try the following formulæ for development:

Water	40 ozs.
Acetic acid (glacial)	2 ozs.
Ferrous sulphate (pure)	1¾ ozs.
Alcohol	1 oz.

or

Water	40 ozs.
Acetic acid (glacial)	180 min.
Lump sugar	¼ oz.
Ferrous sulphate (pure)	½ oz.
Alcohol	1 oz.

Fix in 5 per cent. potassium cyanide of 33 per cent. strength.

Intensification can be carried out by re-development. Take the above developer and add a small quantity of 10 per cent. silver nitrate solution and flow over, or

Water	10 ozs.
Citric acid	40 grs.
Pyrogallic acid	20 grs.

Before use add a small quantity of 10 per cent. silver solution.

The German method of producing almost grainless results is evidently a modification of the albumen or collodio-albumen process. The process gives almost a grainless result, is very slow and very delicate. An outline of the process is as follows: The whites of several eggs are well beaten to a froth and after standing for twelve hours are filtered, an addition is then made of bromide and iodide of potassium and again filtered. The glass to be coated is placed on a level stand and then coated with this mixture and dried. Sensitizing is carried out in a silver bath. After sensitizing the plates are well washed in distilled water to remove free silver nitrate, and can then be dried by heat and are ready for exposure.

Formula for albumen-iodized solution:

Potassium iodide	15 grs.
Potassium bromide	4 grs.
Iodine flakes	4 grs.

Sensitizing bath:

Distilled water	10 ozs.
Nitrate of silver	1 oz.
Glacial acetic acid	3 drs.

Developer: Saturated solution of gallic acid to which has been added a few drops of 5 per cent. solution of silver nitrate. When developer gets cloudy take fresh developer; development is very slow. Fix in 10 per cent. hypo solution. —*B. J.*

Milky Fixing-Baths

PHOTOGRAPHERS sometimes have trouble, especially during the warm summer months, with their acid fixing-baths. Their baths become milky, and, as a result, they get brown or yellow spots, and sometimes a brown tone over the whole surface of their prints. The trouble can be avoided by taking a few precautions.

Prints must be hardened in the fixing-bath, and alum is the best hardener. Alum in combination with hypo will release sulphur; but acetic acid and pure sulphite of soda form a gas which prevents the releasing of sulphur and forms a perfectly balanced fixing-bath. If, however, the sulphite contains sulphate, sulphur will be released and the bath will become milky. The same is true of sulphite which has deteriorated through exposure to the air.

When you are sure that your sulphite contains no sulphate, there is still another precaution to take in mixing your acid fixing-bath. Be sure the hypo is thoroughly dissolved before you add the hardener. If any hypo remains undissolved, the addition of the hardener will release sulphur and make the bath milky.

A properly made fixing-bath should never be allowed to get very warm. Even with an unused bath, if it is made very warm, the gas formed by the acetic acid and sulphite of soda will partly escape and allow the sulphur to be released. The simplest and safest way to make up the bath is to have a stock solution of hardener, then, when the hypo is dissolved in the proper quantity of water, it is an easy matter to add the required amount of hardener.

Prints fixed in a milky acid fixing-bath really begin to take on a sulphur tone while fixing. This may not be noticed when the prints are taken from the bath, or while in the washing water, but all the same, the toning process has begun and will continue even after the prints have been laid out to dry, especially if the room is warm. The result is prints with brown or yellow spots, and sometimes a brown tone fairly even over the whole surface.

Use E. K. Co. Tested Soda of certain purity, and be careful not to expose it to the air. Keep a stock solution of hardener and mix fresh fixing-baths as needed. Do not add the hardener to the hypo until the hypo is thoroughly dissolved, and do not allow it to become warm after it has been mixed. These are all important.

Of course, you all know that a fixing-bath should not be overworked. Prints will neither be properly fixed nor well hardened in a bath that has most of the active chemicals worked out of it.—*Photo Digest.*

Dampness and Faded Prints

THAT there are so many different views held as to the relative permanency of photographic prints is probably due not only to variation in the methods by which the prints have been made, but to the conditions under which they have been kept. When both sets of conditions are favorable a fairly high degree of permanence may be obtained even with silver images, while on the other hand a few weeks or months at most may witness the almost complete destruction of the image.

Leaving out of the question chemical vapors such as might be found in a laboratory—iodine, chlorine, or sulphurous acid—it would seem that there are two main features in the destruction of an ordinary photograph: the sulphurous vapors usually present in town atmospheres, and dampness.

We have lately had an interesting demonstration of the action of damp by the discovery of a large number of photographs, embracing examples of nearly all the processes in common use, which had been stored in a cupboard presumed to be dry, but which by the unsuspected leakage of a pipe embedded in the wall was extremely damp at one side. The photographs were of all ages: some albumen prints made over thirty years ago; bromides of all ages from thirty years to three months; some P. O. P. and collodion prints of all dates, as well as a few carbon and platinum prints and some three-color process proofs—all were in this collection. It may be as well to say that, in spite of their age, all the prints were in fairly good condition when stowed away a little more than a year ago. The deterioration, which has in most cases been utterly destructive, is clearly due to the damp atmosphere. The albumenized prints have faded from a good purple to a yellowish brown, the paper also yellowing. The bromides, originally brilliant specimens, have in the case of untoned prints faded almost away, while sulphide-toned ones have lost much of their strength. Prints on collodion papers have faded badly, showing a spottiness not present in the bromides. Only platinum prints were absolutely unchanged. In some cases mildew has formed upon the surface, but when this was removed the image, as was to be expected, was perfectly good. Carbon prints have stood well, except that where mildew has appeared the surface of the gelatin has been spoiled. A curious effect was observable in the prints from three-color blocks; in some cases the red printing color had, through the action of the damp, diffused itself all over the surface of the picture, and in some cases through to the back of the paper.

As a contrast to this we have prints made under similar conditions which have been kept in dry cupboards, in a gas-lighted, stove-heated room, which have endured wonderfully well.

It is thus seen, then, that damp is a most potent factor in the fading of prints, and every precaution should be taken to protect silver images from it. In the case of framed pictures it is of little use to paste up the backs of the frames as long as the cardboard and wooden back remain porous and permeable to the atmosphere. It would seem that the safest treatment, as far as permanency is concerned, is to dry-mount the prints with a good shellac tissue, and to coat the faces either with a varnish or to rub them with a good encaustic paste.

It must not be overlooked that although toned bromide prints have suffered from their severe ordeal they have not done so to the same extent as the black-and-white ones. In the case of the albumen prints, those toned to a purple have been found to fade less than those of a brown color.

No oil-prints or bromoils were submitted to this involuntary test, but it is to be presumed that they would have stood it as well as a few collotypes which had retained their original freshness. The moral which the professional photographer may draw from this experience is that it is very desirable to keep all showcases and window enclosures well ventilated in damp weather, and that in the case of pictures hanging upon outside walls a couple of corks or studs should be placed at the lower corners of the frame, so as to allow of a current of air passing between the wall and the picture.—*B. J.*

Stripping Paper

M. Tranchant states that all bromide, gaslight and collodion papers may be stripped by the following process: Development should be carried at least twice as far as usual if the results are to be used as transparencies. After thorough washing the print should be immersed for ten minutes in a 10 per cent. solution of formalin, then rinsed five or six times in water and immersed for ten minutes in a 50 per cent. solution of carbonate of soda and drained and the surface moisture removed with blotting paper or a swab of cotton. The print should then be squeegeed down to the glass and left for about an hour in winter, or half an hour in summer, and then immersed for ten minutes in a 10 per cent. solution of hydrochloric acid. Immediately innumerable bubbles begin to make their appearance and in a few minutes the paper can be readily stripped, leaving the image on the glass. If the glass is previously waxed, the image may be subsequently stripped and the film kept between the leaves of a book. The author states that he has used this process with success for making enlarged negatives.—*Phot. Rev.*, 1920, p. 66.

Photo-Filigraine

Namias suggests the following method for obtaining water-marks on paper and states that it has been applied commercially. Soak a sheet of stout paper in water till thoroughly wet, then blot off with blotting-paper and squeegee to a sheet of glass, or rub it into contact with the hand. Then coat with the following solution:

Gelatin	150 g
Glycerin	50 g
Neutral citrate of soda . .	5 g
Water	1000 c.c.

Make this quite hot and allow 25 c.c. to every square decimeter. The glass bearing the paper should be levelled and the solution poured on and allowed to set well and dry with the paper on the glass. When dry the paper should be immersed in a 3 per cent. solution of potassium bichromate and dried in the dark and printed under a vigorous negative, preferably a line subject, such as a diagram. The exposure should be to the sun or an arc lamp, and it should then be treated with water at 105° to 110° F., till nothing but the design is seen to be left on the paper, then the sheet may be hardened in a chrome alum bath and fixed and the paper fastened by the edges to a sheet of glass or cardboard and dried. From this relief a wax or plaster mould can be cast, or a rubber mould made.—*Photo Rev.*, 1920, p. 70.

Restoring Old Paper

M. Strauss finds that old bromide paper may be rendered as good as new by immersing in a bath of

Potassium bromide	30 g
Sulphuric acid	10 g
Copper sulphate	10 g
Water	1000 c.c.

or

Potassium bichromate . .	40 g
Hydrochloric acid	20 c.c.
Salt	10 g
Water	1000 c.c.

Then wash well and immerse in a 5 per cent. solution of resorcin and dry without washing.—*Bull Belg.*, 1920, p. 86.

Varieties of Lenses and the Work for which Each is Fitted

It is possible that the reader may have come to the conclusion that one lens is as good as another for most purposes; but he is not likely to have misunderstood their use to that extent. He will probably realize that one lens is not better than another because the photographs obtained with it necessarily give finer definition, but that the good lens shows its superiority by giving sharp pictures under less favorable conditions.

The simplest lenses used by themselves in practical photography are to be found in fixed-focus daylight enlargers. These are usually nothing more than plain spectacle lenses or magnifying glasses, composed of a single piece of glass. As daylight is plentiful, a very small stop can be fitted to them, and so even as simple a lens as one of these can be made to give a sharp image. If the photographer examine one, he may find that it has a focus of four inches or less, while the diameter of the opening in the stop fitted to it may be less than one thirty-second of an inch; so that the lens is working with a smaller stop than f/128.

Single Lenses

The cheapest hand cameras are provided with what is called a "single" lens, but is actually one composed of two glasses cemented together with Canada balsam. Properly constructed, such lenses will give very fair definition with f/14 or f/16 when they include an angle of about 60 degrees, which is approximately that at which they are used. If such a lens is used at a decidedly smaller angle, the working aperture can be enlarged to f/11 or f/8, or, if the stop is kept the same, the character of the definition toward the corners of the plate will be better.

The cheap single lens just described is sometimes called an "achromatic meniscus." There are more elaborate "single" lenses composed of three or even four glasses cemented together. They are true anastigmats, and can be used at an angle of 60 degrees, or thereabouts, at f/11, and will give critically fine definition over the whole plate. They are not to be found ready fitted to cameras, however, as they are costly, and, in single form, are comparatively slow. Some of the finest anastigmats consist of two such lenses used together. They then work at f/6 or so, and will be mentioned later.

The Rapid Rectilinear

The reason why hand cameras are not supplied with such single anastigmats is that a large aperture is very important for hand camera work; and if something a little better than an "achromatic meniscus" can be provided, a "rapid rectilinear" will give a greater increase in rapidity than the single anastigmat, though without the very fine definition of the latter. Nearly all rapid rectilinears, or "R.R.'s," as they are written, work at f/8. With such an aperture, over an angle of 60 degrees, they give distinctly better definition than the "achromatic meniscus." In very small sizes, and for special purposes, they have been fitted with f/6 or larger apertures, but at the expense of the definition toward the margins of the picture.

The Anastigmats

When a more rapid lens than one at f/8 is required, we come into the class of anastigmats. Some of these only work at f/7.7 (which is practically f/8) or at f/8; but at this aperture they should give distinctly better definition toward the corners than an R.R. at the same aperture and including the same angle. Anastigmats of various patterns are made to work at f/7, f/6.8, f/6.5, f/6, f/5.6, f/4.5, and some at f/4, and even at f/3.

Any of these, critically examined, should give at its full aperture and over the same angle as fine definition as the f/8 anastigmat gives at f/8, and very distinctly finer definition than the R.R. with similar conditions. But there are degrees of fineness, even among anastigmats.

Convertible Lenses

Some anastigmats and all rapid rectilinears are "convertible." That is to say, part of the lens may be removed, and the part which is left used by itself. The part will have a decidedly longer focus than the whole lens. It is customary to assume that the focus is doubled, but this is only a rough approximation; and if the difference is not known, it should be found by trial.

As the size of the stops remains the same while the focus is increased by removing part of the lens, the f/ numbers of the stops are altered proportionately to that increase. Unless the camera has "double extension" or more there is no advantage in a convertible lens, as the "single combination," as it is called, cannot be used without the extra extension.

Claims are sometimes made for lenses that their single combinations can be used alone, which claims, while justified in the letter, are actually misleading. It must not be forgotten that while any positive lens, that is to say, any lens which will act as a magnifying glass, *can* be used to take a photograph, it is of little use the photographer having such a lens unless it can be used with a fairly large stop. A dealer, therefore, is hardly justified in saying that a lens is "convertible," or that its single components can be used separately, unless this can be done without having to use a much smaller stop than that in the complete lens.

Thus if the complete lens works at f/6.5, its single component ought to give an image practically equal in definition with that same stop. The f/ number of the stop, it should not be forgotten, is no longer f/6.5, although the size of the opening has not been altered. If the half lens has twice the focus of the complete lens, f/6.5 will become f/13, and so on in proportion.

"Portrait" Lenses

Omitting telephoto lenses, which hardly come within the scope of the beginner, these are the principal types likely to be met with. There are also "portrait lenses," which, until anastigmats of large aperture were made, were the only very rapid lenses available, and therefore were those generally used for portraiture. They work at f/3.5 to f/4.5, and are very useful for their own particular purpose; but they, too, are a little beyond the beginner.

A few words may be added on the purposes to which the different types may be put. Practically all the lenses named are available for all purposes, when conditions permit; it is hardly anything but a matter of rapidity.

For hand camera work, for example, f/16 is decidedly slow, so that the possessor of a hand camera fitted with such a lens is limited, as far as snapshots are concerned, to open subjects in a good light, and to those which are not in such rapid motion as to need a very fast shutter. If his lens works at f/8 his powers are proportionately extended; he can give exposures one-fourth as long in the same light, or exposures of the same length in light one-fourth as powerful, and get equally well exposed results. With anastigmats at f/7 or f/6 the scope is still wider.

A Limitation of Aperture

It must not be forgotten, however, that the larger the stop the less capable is the lens of giving near and distant objects sharp at the same time, and the more necessary is it to focus accurately. Many a worker who has got sharp pictures with a cheap camera and f/16 lens has invested in an anastigmat, working, say, at f/6.5, only to find that his pictures are no longer so sharp. Either he is not focussing carefully, or he is attempting subjects which demand more depth of focus than his anastigmat at the large aperture will give. Were he to stop it down to f/16 he would find that it would give him finer definition than his old lens, and was just as easily worked. A high-class lens is an instrument of precision, and to take advantage of its qualities, one must learn to use it as such.

For landscape work, or for any form of photography in which the camera can be put on a stand and a time exposure given, there is not so much to be gained by the use of a high-class lens. For architecture, for instance, it is not very important whether we have to give five seconds or five minutes, so little is gained by using a lens at f/6 instead of one at f/16 or f/22.

Distortion with Single Lenses

One characteristic of the single lens, however, must be mentioned in that connection. Such a lens, whether merely an achromatic meniscus or a single anastigmat, is not what is called "rectilinear." (It must not be forgotten that many lenses besides so-called "rectilinears" are actually rectilinear.) That is to say, single lenses give a more or less distorted image. The degree of distortion is often altogether over-rated. One may use such lenses on subjects likely to show it, and never notice it at all, unless it is deliberately looked for; while the vast majority of subjects which the amateur photographer attempts would in no case reveal it.

This distortion is such that when a straight line in the subject is photographed so that it falls near one of the edges of the picture, and more or less parallel with that edge, the line in the photograph is not straight, but is more or less curved. It is only likely to be noticeable at all in certain architectural subjects, and in certain forms of copying.

The narrower the angle included by the lens, the less likely is it to be in evidence. So that while it may be noticed when a camera fitted with a single lens is used, it is not likely to show if we are using half a convertible lens: as such an instrument, used on a plate of the same size as the whole lens is used on, would be including a comparatively narrow angle.

Lenses for Portraits

A lens for portraits should be rapid, so as to allow exposures to be kept short. It is also advantageous to have it include a narrow angle only. If the lens ordinarily fitted to a camera, which, as has been pointed out, usually includes an angle of about 60 degress, is used for portraits, there is likely to be trouble with what are called "wide-angle effects." These are often very noticeable. A sitter's hand, for example, if it is decidedly nearer to the camera than his head, will appear magnified out of all proportion. A shoulder or arm turned toward the camera is similarly distorted. The immediate remedy for such defects is to move the camera further away, which gives the sitter on a smaller scale. With such a camera and lens, therefore, it will be best not to use the whole of the plate for a portrait, but to be content with cutting a small picture out of the middle of it, or enlarging. When getting a lens for portrait work only, it is wise to get one of at least double the focus which would ordinarily be used on the same size of plate for landscape, architecture, and general work.—*Amateur Photographer.*

Color Sensitizers for Two-color Photography

English Patent No. 134,238.

The invention is for improvements in or relating to color photography of the class wherein two sensitized surfaces superimposed are simultaneously exposed, and has for its object to render such color photography more simple in operation. According to the invention, a sensitizer for the class of color photography referred to above comprises pinacyanol, pinaverdol, pinachrome, flavasine, and ammonia, mixed with water.

Preferably the proportions employed are as follows:

Pinacyanol	2 grs.
Pinaverdol	6 grs.
Pinachrome	2 grs.
Flavasine	4 grs.
Ammonia .880	4 ozs.
Distilled water	1300 ozs.

In making up the sensitizer, the first four ingredients in the quantities stated are preferably dissolved in 10 ozs. of boiling alcohol and stirred for ten minutes until thoroughly dissolved, after which 1300 ozs. of distilled water may be added at a temperature of about 70° F., and then the 4 ozs. of ammonia. The film or plate to be sensitized is immersed in this mixture for about five minutes, and kept constantly in movement. The drying should be effected quickly at a temperature of about 75° F.

A plate or film sensitized by this formula is panchromatic. In operation, one such panchromatic plate may be superimposed with a non-panchromatic plate, such as are already on the market, or two panchromatic plates, whereof one or both may be sensitized according to this formula are employed. The two plates are preferably put with the sensitized surfaces face to face, and may be exposed in any ordinary camera. If a non-panchromatic plate is used, this is preferably placed on the lens side of the panchromatic plate.

The two plates thus superimposed are exposed simultaneously, and the first plate cuts out a certain amount of color from the second plate, so that the resulting two negatives represent different color-values, and this difference is made greater by use of the special sensitizer described than is possible with two panchromatic plates, such as are at present obtainable, or one of such known panchromatic plates and a non-panchromatic plate.

The negatives are developed, and from each a positive print is made, one of which may be on opaque paper, and the other on transparent material, such as celluloid. These prints are then toned up to different colors, one, say, to an orange-pink tint and the other to a blue; the orange-pink would be employed for the positive, which is produced from the negative that was nearest the lens.

The marked difference of color-values obtained, owing to the use of the special sensitizer described, leaves room for considerable manipulation of the prints, so that the depth of color of either may be deepened as required to obtain a proper balance according to the subject in hand. This balance can only, of course, be judged by the operator for each subject, and will depend largely upon individual taste, but the fact that a large difference of color-value is obtained by means of this invention in the two positives leaves scope for the desired manipulation.

For quick work the two panchromatic plates prepared with the special sensitizer given above is preferred.

If one print is on paper and the other on a transparent material the transparent print will be afterward superimposed on the opaque print, and the two may then be mounted in any desired manner. With practice, a colored photograph having considerable resemblance to Nature can thus be obtained.

Although plates have been referred to, obviously films may be employed, and also the finshed product may be made as a transparency by utilizing transparent material for both prints.

The invention may be applied to cinema films, the celluloid portion of which may be of ordinary manufacture, but the sensitizing material for one or both of the films must be made according to this invention. The two films can then be run simultaneously through the camera, and the subsequent treatment will be the same as has been already described with reference to plates, except that the final product will be a transparency.

Instead of toning the final product to different colors, the film may be stained the desired colors on opposite sides, though for the production of ordinary colored photographs the process at first described must be used. For cinematograph work the staining is possible because of the persistence of vision and the strong light behind the film.

Where two panchromatic plates, sensitized according to this invention, are employed, the color-values are still more widely different, owing to the amount of color which is stopped by the plate nearest the lens, and this is sometimes an advantage, as it enhances the ease with which the strength of the different tints can be adjusted one to the other.

Methods of Coloring; Print-out Formulas

The public of today shows an ever-increasing interest in color, and the Kodak Company and large stores, being alive to this fact, arrange "color feasts" to arrest our attention. Photographers are sure of a draw if they introduce just one striking picture in color in their window, not necessarily a figure subject: a local scene at its best, a sunset or a war photograph in color is suggested. Passing a studio window at the seaside last summer, I was obliged to turn back because a strong seascape was shown merely toned blue. A colored enlargement of a hotel fire was a great draw for another maker of portraits.

Thinking that many photographers may have recognized this fact and are wishful of trying their hand, it is proposed here to review the various processes of applying color, with the suggestion that my readers should take up one method, practicing it until mastered. It is also hoped that those who have started will find some hints and assistance. Each of the processes has its advantages and disadvantages; the easy ones are limited; others with a wider range, such as solid oil painting, require study and practice.

Mediums

To save repeating the formulæ for mediums I will deal with them first, because wax is useful with several and casein with all methods.

No. 1

Artists' prepared oxgall	20 drops
Methylated finish	1 oz.
Water	2 ozs.

The spirit makes the above milky, but is not detrimental to its usefulness; if you can get pure alcohol all the better.

No. 2

Gum senegal	¼ oz.
Water	2 ozs.
Methylated finish	1 dr.
Acetic acid	10 drops
Sugar	1 dr.

Lump senegal is best, and should be dissolved first by soaking it in 1 oz. water. Useful with water colors on glossy paper.

No. 3

Casein paste	2 ozs.
Methylated finish	2 ozs.
Glycerin	3 drops
Carbolic acid	5 drops

As the uses of casein are so little known to artists some description of it is necessary. A proteid obtained from cow's milk by removing fat, the precipitated curd is washed and dried, forming a yellowish substance like fine sand when finely ground. The best qualities are used as food, the coarser kinds for cements and wall paints. We are only concerned here with the insoluble variety, which is made soluble in water by a number of agents, *e. g.*, caustic soda, ammonia, carbonate of soda; but for our purpose borax is best. When ordering or writing for samples it is advisable to state clearly for what purpose you intend to use it. Paper manufacturers make use of it in various ways, and it is used in photographic base paper as a superior kind of size. It is useful as a medium for dyes and water-colors, as a size for bromide paper before commencing in oil color, and as gum will not allow of spirit being added in any quantity, casein is the binding medium for aërograph colors. For the same reason it makes a good fixative; no "tears" are formed, as is the case with gum-water. It is superior to shellac, as the latter, when thinned with alcohol, gives too much transparence to the whites of chalk and pastel, darkens colors and turns black in time.

To make the 2 ozs. of casein paste, take 1 oz. casein, mix it in its dry state with 3 drams of borax, next add enough cold water to cover it (about 1 oz.), stirring all the while. Then add about 2 ozs. of boiling water until a smooth paste is secured, allow to stand a day, when grit and dirt settle to the bottom. If pure alcohol is added a clear varnish is obtained. With methylated spirit it is milky, but when tested on glass it will be found to dry perfectly clear.

For large quantities it is best to soak 1 lb. in 4 lbs. cold water overnight. The water is added gradually and well stirred. In the morning add 15 per cent. of borax and heat up in a steam kettle to 120° F. In this way lumpiness is avoided and a smooth paste secured.

The above will be found more satisfactory than the following:

White cheese	50 gms.
Liq. ammonia to . . .	150 c.c.

Rub the cheese in a mortar to a paste with a little of the ammonia, and then add the remainder. Then add:

Alcohol 50 per cent. . . .	200 c.c.

and place the bottle in a warm place till the sediment has subsided, then filter. *B. J.*, Sept. 22, 1916, p. 519.

No. 4

White wax	½ oz.
Gum elemi	1 dr.
Oil of lavender	40 drops
Alcohol	1 oz.
Turpentine	1 oz.

First dissolve the gum elemi in the turpentine, and then, by means of a water-bath, melt the wax, add the oil of lavender, stir well, next add the alcohol, finally the elemi solution, remove from heat, and stir well until cooler.

Casein, gum senegal, gum elemi, carbon tetrachloride, water-nigrosine black can be obtained from Messrs. Harringtons, Ltd., 4, Oliver's Yard, City Road, London, E. C.

Coloring Postcards

The simplest and cheapest method of coloring is that put forward in *B. J.*, Jan. 19, 1906, for postcards, and considered more permanent than aniline dyes for shop window exposure. The colors were three in number, the simple primaries: "Yellow," an aqueous solution of gamboge; "Blue," an aqueous solution of indigo with oxalic or other acid; and "Red," a solution of dragon's blood in methylated spirit. The red to be used first, the yellow next, and the blue last by means of an "air brush," a camel's hair brush being used for spotting only. Briefly, the three-color process by hand method. Genuine dragon's blood (a resin) is now difficult to get, but a cheap imitation pigment can be purchased. Prepared as a water-color from cochineal lake. burnt sienna and gamboge, no spirit is required. In making postcards, say a flower or view series for coloring, the question of a color scheme should be considered first; one sees attempts at coloring on most unsuitable harsh B. and W. cards.

Coloring with Dyes

The mere mention of dyes suggests the word fading at once, which is very unfortunate, because they are really ideal for coloring slides. The length of time they are exposed to intense light, and that not daylight, is relatively short. Therefore, the question of permanency is not so important, but ease of application and transparency is. The extreme thinness of the tint on prints is no doubt one of the reasons of their being fugitive, as when some of the dyes are put on alumina or similar base they become pigments, with a better reputation.

There is no such thing as an "absolutely" permanent dye, and it should be noted the word "absolutely" is never used by pigment makers; even "permanent" is capable of such a broad meaning that it would take a column of print to define it. Dye manufacturers refuse to give any information regarding the length of time different colors will remain fast to light, and a further difficulty for colorists is the custom of the trade not to give the chemical name of dyes. This fact handicaps me in not being able to say the best stains to use, especially as there is nothing else to use for the after-processes of glazing and celluloid facing. Water-soluble dyes, or "photo-colors," are put up in a variety of trade names and forms—liquid, powder or paper. If you are not likely to use a quantity, about six to eight colors should be purchased in powder form and kept in bottles. They can then be used for a variety of photographic purposes, and mixed with water, gum, casein or gelatin suitable for the work. Intense color can be made if you have the powder form.

When setting a palette put, say, six spots of No. 1, 2 or 3 mediums about two inches apart on a piece of opal; then add a few grains of one color to each drop of medium. By the time other materials are got ready they will have dissolved. Failing opal, ordinary glass with white paper pasted underneath answers well. Requisites are: One small pointed brush and one larger and flat brush, some blotting paper, a piece of fine turkey sponge, a saucer for large washes, and a bottle of weak ammonia water. This latter is for making corrections by bleaching the color, and should not be used unless other means fail to remove the tint. A fragment of blotting paper wetted with the ammonia and laid on the spot is the safest way to remove the undesirable color. Clean water should be applied afterward to wash away the ammonia. If you consider your work a failure, do not throw the print away; put it in running water for an hour or so, when all the color will be found to have been washed out, and on taking up the print again you will make a success of it.

Prints should be unmounted, and in order to make a wash of tint run evenly on P. O. P. or bromide, soak the paper and lay it on glass, take up the surplus water with the sponge, then apply the tint required, made weakly, in a saucer. It is best to deal with the background or largest space first, then the next largest (the clothes), then the hair, finally the face. If the first wash after blotting is not even, while still damp apply the same tint again and work the brush in a rotary fashion, giving attention to thin places, Colors must be kept delicate at first, as they dry out darker and stronger than they appear when wet This point is a technical difference from ordinary water-colors. For small washes and strong mixtures use the palette.

Use blotting paper or cotton-wool wetted and squeezed out, if you wish to prevent dyes acting too quickly. Don't hurry: give the necessary time to build up by repeated washes, and you will be successful, In mixing dyes it is the same as with other colors: the fewer you use the more permanent the result. If, when looking at the work obliquely when dry it appears patchy, the whole of the print should be sponged with clean water and allowed to dry. Sometimes a rub over with methylated spirit on clean cotton wool, or a polish with No. 4, will level it up.

Dyes show to advantage on glossy P. O. P. and on superior kind of bromide and gaslight papers; these require no preparation except the wetting mentioned. Collodion prints should not be attempted, as in trying to achieve the impossible time is wasted; neither do the dyes show such clear tints. "Transparent water-colors," the American name, only stain gelatin papers; on all others they wash off like water-colors. If you must color papers without a gelatin surface, size the print with ¼ oz. gelatin in 5 ozs. warm water, allow to dry, then harden by a dip in formalin bath. Do not use alum; it has a bad reputation for reacting on colors.

Formalin should be used, and not stronger than 10 per cent., or the surface will be horny and repellent. Lantern slides are better for a dip, especially if your brushes are worn. Chinese white mixes well with dyes, gives a wider range of tints, adds to the difficulties, and, of course, not being a dye.

Dry Uses

Once the skill of laying down an even tint of dyes is acquired it can be turned to good account to modify the printing quality of negatives. Say a child in white has been taken, standing on a dark green upholstered chair (the best available in an "at-home" portrait), and the negative is too contrasty, the quickest way out of the difficulty is to tint the chair in the film a weak yellow tint. In out-of-door portraits, such as a dark girl against foliage in shadow printing the same value as the dark hair, and giving no relief, a mere tint over the foliage in the film will work wonders. Wet the plate and use a weak gamboge tint, because the colored wash, by reason of contrast, shows better where the tint is being carried. One trial of one tint will be a guidance for further work. If the negative is not soaked it soon dries.

If the photographer is nervous of tinting the film, try a yellow dye with No. 3 on the glass side. As No. 3 contains spirit it dries more quickly than gum. Use the dye in powder form; it soon dissolves in this medium. The glass must be clean, and, of course, the more of No. 3 used the thinner the color. Having made the tint you think will answer the purpose, paint or float over the back of negative, wait half a second for the spirit to evaporate, and while the paint is tacky wipe off where not wanted. When the first tint is dry, a further wash to strengthen the tint can be made with a brush, or the tint dabbed on with cotton-wool. Shading during printing has its limits; even the tissue-paper dodge takes time to arrange, just for one awkward spot in the negative, therefore those who have not tried paint on back of negatives should refer to *B. J.*, July 5 last, for further details.

Contrasty negatives and blocking-out hardly come under the heading of coloring methods, but while on the subject of dyes I wish to point out their use to photographers. Water-nigrosine black in powder form, made into a creamy paste with No. 3 and applied, makes an effective blocking-out paint. It soon dries and smoothly, does not stand up in ridges or relief like a more solid opaque paint, and has the appearance of a more workmanlike job.

The method of cream-toning prints by means of a hypo bath is well known. When changing the color of a mount, it is best to have two dishes, one filled with cold water and one with the selected color. First dip the mount in the cold water, going over the same with a large brush or with cotton-wool, to remove air-bells. Then quickly transfer to the dye bath. The more quickly it is done and blotted the better. Avoid soaking or any rubbing of the mount, otherwise, if three-ply cardboard, it will blister and separate.

Spirit Dyes

Vast quantities of fancy goods are decorated with dyes soluble in spirit, stencilled goods with the air brush, photographs by the rag and rub-on process. Mr. Newman Horne's finishing method with spirit nigrosine and alcohol, together with 10 per cent. of chloral hydrate added to soften the gelatin, could be extended to other colors.—Burlington in *B. J.*

Repairing Blisters in Enlargements

Bromide enlargements are sometimes discarded owing to the occurrence of blisters either before or after mounting or which have developed after heat has been applied in dry-mounting, but the following is a remedy which has repeatedly been found very effective.

With a soft pencil mark very faintly round the edge of the blister, and then with a sharp knife cut just deep enough to go cleanly through the film, following the mark of the pencil, but not completely round to the starting point. Just enough of the disc of film should be left unsevered to allow of the film remaining attached to the print. A very sharp knife is necessary to ensure a clean cut, for it must be remembered that the film has to be laid down again in exact juxtaposition.

The disc of film having been turned back, laying bare the paper below, this latter is moistened with a little clean uncolored adhesive (such as artists' gum water as used for mixing with spotting colors), and the cut-out piece of film is laid down again and pressed firmly into contact with a piece of blotting-paper.

Sometimes with small blisters it is necessary only to moisten the loose piece of film with water in order to obtain good contact on pressing it down again.

If the blister has not been cut to the edge, or rather to the extent of the air-space between the paper and the film, the gum must be inserted underneath with the brush.

When thoroughly dry the spot should be cleaned with pumice powder, and if the film overlaps it should be knifed down.—*B. J.*

Two Useful Cements

For cementing any hard material, such as broken porcelain or glass, which is not required to stand heat, a very useful cement is made as follows: Gelatin is soaked in its own volume of water for three or four hours at a moderate heat, an equal volume of glacial acetic acid added, and the whole heated till thoroughly homogeneous. It should set to a stiff jelly on cooling, and if not, more gelatin should be added and the whole reheated. The surfaces to be repaired should be dry and clean and heated, the cement being applied warm with a strip of wood. The surfaces should be squeezed together and the article bound up with twine and left overnight to set. The excess can be washed off by means of a cloth and a little hot water. Where the article has to stand the action of hot water, the best cement is bichromate glue, which is made as follows: Soak ordinary glue overnight in water and pour off the excess. Melt the glue by standing the containing vessel in a pan of boiling water. To this add about one-tenth its weight of bichromate of potash in a finely powdered state, and maintain the whole at a good heat till the salt is dissolved. The blue is applied as before, and to assist the hardening it should be exposed to light.—*The Amateur Photographer.*

The Art of Negative Making

Some few weeks ago an advertisement appeared in these pages for a "negative maker." Without asserting that such an advertisement never appeared before or since, as a cover-to-cover reader of photographic literature I have only seen the one, and in a long and chequered career have only met three craftsmen whose work consisted purely and simply of negative making. And yet in the quality of the negative lies the secret of good photography and on the making of it hangs the smooth running of much of the after work.

A fellow "pro." once remarked to me that the customer did not see the negatives, and so if the prints were all right nothing further mattered. I pointed out that customers don't usually see beyond the reception-room and studio, but that was no argument for a cramped or leaky dark room.

Bad negatives are discouraging in their very appearance. They increase the labor of retouching, they use up the printers' time and temper, and they waste paper and developer. And there are more bad negatives made than good ones. I might go further and say that a really good negative—a negative that strikes expert and tyro as decidedly good at a glance—is exceptional.

Now the making of a good, an undeniably good, negative is by no means a difficult process. It requires neither genius nor luck, for before the days of tank development, artificial light, and plates of the high-velocity type, good negatives were common. Anyone who has seen and handled professional negatives of thirty years back will endorse this.

It would seem, therefore, that slow plates, dubious daylight, and cumbersome methods of development are necessary for good results, while tanks, half-watt lamps, and fast plates are responsible for the unreliable negatives that most printers know only too well. Slow plates certainly have advantages that are not universally recognized, and the desire for "speed" is responsible for much poor work, but good negatives can be made on any plates more easily by modern methods than by the laborious means that the old school was dependent on. It is only necessary to give the modern methods a fair chance and not to expect impossibilities to see how much superior they are in every way.

The beautiful negatives of thirty years ago were—many of them—made in spite of the prevailing conditions: they simply had to be good, for any imperfections would be faithfully reproduced in the prints. Just as there were no fast plates or electric light to overcome dark days, so also there were no extreme grades of papers to "cover up" faulty negatives. The advantages possessed by the modern photographer should mean improved negatives, but they offer a clue as to why the improvement is exceptional rather than the rule. Under the old conditions it was imperative to take negative-making seriously. A badly exposed or wrongly developed plate was equivalent to a re-sitting. Negatives that were impossible in appearance were usually considered impossible for printing, hence they were discouraged. With present-day methods the same anxiety is not necessary, but no methods are entirely automatic and a modicum of care is essential with any methods to ensure correct results.

A perfect negative might be described as one of a well-lit subject which had been correctly exposed and developed. Lighting is, of course, an artistic function, and as every artist has individual ideas (without which there would be no art) I will pass over lighting with a solitary hint. When the required effect is difficult to get, owing apparently to sheer cussedness on the part of the daylight, it is sometimes useful to photograph a white background—making sure it is white, no mixed tints or uneven patches—with a very short exposure, the lighting being arranged as evenly as possible. Any unsuspected unevenness in the light will show up surprisingly on the negative, and by its aid can be traced and remedied.

Daylight exposures are generally reckoned by the process of mentally "reading" the light, a practice which requires much experience to become expert at. Approximately correct exposures for any time, any weather, can be calculated with the assistance of one of the many exposure reckoners on the market. True, these reckoners do not include a section for studio work, but the exposures advised for "indoor portraiture" divided by some particular factor will be found suitable. The factor can be found by experiment. For instance, suppose six seconds is advised at $f/8$ with such and such a plate under such and such conditions, and two seconds is found to be correct by experiment in the studio under identical conditions, then all calculations from the reckoner should be divided by 3.

Artificial-light exposures are less variable and can be kept well in hand by the occasional use of an experimental plate. It should be remembered, however, that an exposure that is correct for a full-length "sketch" of a lady in white is not sufficient for a black-coated bust against a dark ground.

Tank development is a process that makes us wonder what we did without it. The development of a couple of hundred plates is now a vastly different thing from what it was, and the ease with which plates can be put through is no small consideration, particularly when no risk of bad results is entailed. If the important details of tank work are neglected, however, there is a big risk.

The details I refer to are accurate compounding of the developer, thorough mixing and careful dilution, time, and, last but certainly not least, temperature. To take them in the reverse order, temperature is more likely to trip up a careless worker than anything else. I remember once asking an operator why he did not use a thermometer. He replied that the hot water he used to dissolve his sulphite "just brought the tank up to the mark." This occurred on a frosty night. The following August he was still proceeding on the same lines, oblivious to the fact that "the mark" had risen some thirty odd degrees.

A slight mistake in time is not so serious, but it is very little trouble to keep both time and temperature exact.

Developing formulæ and dilution are matters of individual choice; any developer at any strength in reason will produce fine negatives if used deliberately and with intelligence.

Negative making is considered by some as ended with the fixing. Others include reduction and intensification, while others bring in retouching and other artistic or mechanical treatment. To go into them all would be too lengthy, but a passing word on each will not be out of place.

Reduction of harsh negatives is often carried out with Farmer's formula when the correct thing would be persulphate. The reason for this is probably that persulphate needs a little coaxing; sometimes it seems to hang back, sometimes it needs acidulating. Intensification still goes on with mercury-ammonia in spite of all that has been said and written on the advantages of bichromate. For those who haven't bichromate handy, mercuric iodide is far superior to the chloride and much simpler and safer. It consists of one solution only, it does not demand careful washing out of hypo, it seldom stains, and, besides being a useful intensifier, it will also detect improper fixation by whitening any invisible silver thiosulphate which can then be fixed out by re-immersion in hypo.

Leaving retouching alone as far as these remarks are concerned, I would still like to point out that where an aerograph is handy it can be turned to distinct advantage on certain negatives. Copy negatives can be vignetted and sketchy backgrounds strengthened with an aerograph in as many seconds as it would take minutes by any other means. For this work red dye is preferable to paint, though it has the disadvantage that it will not rub off if required.—*B. J.*

Making Enlargements from Film Negatives

It has been the common practice of many photo-finishers in making enlargements from films to sandwich the negative between two layers of glass, in order to keep it perfectly flat.

But this process does not give as clear and as distinct a copy as one is warranted in expecting to get from a good negative. There is invariably a fuzziness about such projections, leading one to believe that the negative was not properly focused; whereas, this is caused by the light passing through the glass being diffused, resulting in the undesirable fuzziness. A familiar example of this refraction is decidedly marked when a stirring rod is placed in a graduate filled with water. The rod has the appearance of being bent.

In making enlargements, this diffusion occurs only when there is a glass placed between the negative and the easel. Such diffusion not only affects the clean sharpness of the enlargement, but also has a tendency to flatten it. Therefore, to get the best results in projections, be careful that there is nothing to divert the rays of light after they pass through the film negative.

Where quantities of enlargements from the same negative are to be made it is advisable to cut a mask from pressboard, of the proper size, and tip the edges to the glass. This board is of the right strength to keep the film taut.

This scheme will do away with the necessity of using two plates, and permit projections directly through the film, with the result that the finished enlargement is much clearer and more pleasing.

Try this the next time you make enlargements and see if you are not well satisfied with the change.

Fumes and Dampness

Work rooms should be well ventilated at all times, but they are less likely to be well ventilated in damp than in dry weather. In damp weather it is very important that the stock of sensitized paper be stored where it is dry and where there is little chance of gas fumes reaching it. By gas fumes we mean the fumes of coal fires, of coal gas, natural gas or such fumes as are produced by the old method of silver recovery with sulphide, or the sulphide toning process.

The zinc method of silver recovery does away with sulphide fumes and should be used in all cases where it is necessary to recover silver in the studio. Fumes from heating gas may be overcome by keeping paper away from stoves or places where gas is used and by having cabinets for the storage of paper near the floor, being quite certain that the floor and the cabinet in which the paper is stored are quite dry.

We have seen perfect prints made from paper that was several years old and we have seen comparatively fresh paper that had been ruined by exposure to gas fumes, the result being the same as fogging. With proper storage developing-out papers will keep in perfect condition for a very long time.

Once the paper has been properly stored it is bad practice to open a package, remove the wrappings and expose the entire amount of paper to the damp air of the work room when only a few prints are to be made. Work rooms are usually damp and if paper is exposed to dampness for any great length of time it will become desensitized in spots, while prints that have been exposed but not developed will lose a considerable portion of the latent images that have been impressed upon them if left for any time before development.

To be perfectly safe, develop prints as soon as they are exposed. If a work room is at all damp, do not leave exposed prints for as much as an hour before developing, and never allow exposed prints to stand over night for development the next morning. If paper seems to lack sensitiveness, don't blame the paper. Look for dampness. Try another lot of paper that has not been opened and dry out the paper that has become damp.

A dry cabinet for paper should be air-tight. If it is not, any dampness in the air will get into the cabinet. Of course moist air will enter the cabinet when the door is opened, but this can be overcome by placing a box of calcium chloride in the cabinet. The box should be a tin one with perforated cover. As soon as the calcium chloride becomes moist it can be dried out by heating and replaced in the cabinet. These few precautions will obviate a lot of unnecessary trouble in damp weather, will save time and material and keep your temper even.—*Studio Light.*

Photographic Materials and Processes

Photographic science; Studies in ——. H. J. Channon. Phot. J., 1920, 60, 164—173.

The effect of intensity variation on contrast is not regular but is a function of the plate. With very weak intensities the maximum density obtainable with very prolonged exposures is a function of the intensity and of the plate, but is generally much smaller than the density obtainable by an equal exposure of short duration and high intensity. Reversal can be produced by continued exposure to a weak intensity after production of a latent image by normal exposure. A similar reversal can be produced by exposure to (not necessarily contact with) metallic zinc, with the difference that if reversal is produced by light action the plate sensitiveness is destroyed, but not if reversal is produced by zinc. The production of a positive by development in white light is shown to be partly due to the screening effect of the image first formed, and partly due to an actual loss of sensitiveness by the exposed and partially developed film. A number of experiments are described, for details of which the original paper should be consulted.

Photographic sensitizers; Studies on ——. *I. The isocyanine dyestuffs.* W. H. Mills and W. J. Pope. Phot. J., 1920, 60, 183—198.

Several members of the isocyanine class of dyes, produced by the condensation of 1 mol. of a quinolinium alkyl-iodide with 1 mol. of a quinaldinium alkyl-iodide have found important use as color-sensitizers of photographic emulsions, the best-known being Pinaverdol (British, Sensitol Green). Their general constitution is probably best represented by the formula $(R)N.C_9H_6(4') : CH.(2)C_9H_6.N.(R)I$ (see also Mills and Wishart, Trans. Chem. Soc., 1920, 117, 579—587). The preparation and properties of 20 isocyanines are described, all of them having been examined as to their sensitizing effect on photographic plates by bathing in a solution of 1:75,000. The parent body (1.1′-dimethylisocyanine iodide) is a strong sensitizer, sensitizing up to about 6400; the introduction of a third methyl into the 6-position gives a still stronger sensitizer (Pinaverdol). The replacement of the first two methyl groups by heavier groups (ethyl, *n*-propyl, and *n*-butyl) reduces the sensitizing effect in increasing amount. The introduction of a third methyl group into the 6′-position reduces the sensitizing effect, as does also the introduction of two more methyl groups into the 2′- and 6-positions, or of a cyano or phenyl group into the 2′-position. The 1.1′-diethyl compound (Ethyl Red) is similar to the 1.1′-dimethyl compound, but a somewhat weaker sensitizer, and the addition of other radicles into it has a similar effect. The introduction of the amino-group into the 5-, 6-, or 6′-position in 1.1′-dimethylisocyanine iodide increases the sensitizing power to about the same extent in each case, but the introduction of the acetamino group has only a slight depressing effect in the 6′-position, stronger in the 6-position, and very strong in the 5-position. The effect of the cinnamoyl-amino group in the 6-position is less than that of the acetamino group. The 1.1′-diethyl-6-ethoxy-6′-methoxy compound is a strong sensitizer, corresponding with the German Pinachrome.

Light-filters; Preparation of ——. G. Potapenko. Z. Wiss. Phot., 1919, 18, 238—239. Chem. Zentr., 1919, 90, III, 307.

The most suitable form of light-filter for Uviol lamps appears to be stained gelatin film. The usual method of preparing these, viz., by coating glass with gelatin solution containing the dye, drying, and stripping, is described.

Auramine as a sensitizer. O. Bloch and F. F. Renwick. Phot. J., 1920, 60, 145—146.

Auramine, when used by itself, has very slight effect on the color sensitiveness of silver gelatino-bromide plates; the effect on gelatino-chloride plates is, however, very marked, a new band of sensitiveness to the light blue being added. In conjunction with dyes of the isocyanine class (*e g*., Sensitol Green—German "Pinaverdol") or of the quinocyanine class (*e. g.*, Sensitol Red—German "Pinacyanol") there is marked enhancement of the sensitizing properties of the latter dyes in regions of the spectrum for which auramine itself does not sensitize at all. The amount of auramine required is much less than is required to produce a definite color-screening effect. The auramine also restrains the logging tendencies of the isocyanine dyes. Spectrograms are given illustrating the effects obtained.

Theory of organic developers. B. Homolka. Korr., 1919, 56, 387—391. Chem. Zentr., 1920, 91, II., 660.

THE loss of developing power by the introduction of a carboxyl group into pyrogallol in the formation of gallic acid is explained by the formation of an anhydride by the carboxyl group and the hydroxyl group in para position to it. Pyrogallolcarboxylic acid and catechol-*o*-carboxylic acid, in which such anhydride formation is not possible, are both developers.

Photomicrography with simple apparatus. T. J. Ward. Analyst, 1920, 45, 130—133.

FOR magnifications up to about × 4 the camera is fitted with a short-focus (10 to 12 cm.) single meniscus photographic lens, whilst by placing a large diameter lens on a support between the camera lens and the object magnifications up to about ×8 may be obtained. For magnifications up to about ×75 the camera lens is replaced by a microscope objective fitted into a cork. For most purposes "ordinary" plates are the most suitable.

PATENT NEWS

Strong (photographic) prints from weak negatives; Process for producing——. G. Staess, Berlin-Steglitz. Ger. Pat. 316,087, 1.5.17.

A THIN film of transparent gelatin or celluloid, colored red by means of potassium ferric oxalate and ammonium thiocyanate, is interposed between the negative and the printing paper. This is bleached as printing proceeds in inverse proportion to the density of the negative, and the effect of printing under a steeper negative is obtained. The bleached film regains its color on storing in the dark. The amount of intesification obtained many be reduced by partial bleaching of the film before printing or increased by using two or more films.

Photographic color process; Theoretical basis of a new direct——by means of colored substances. P. R. Kögel. Phot. Korr., 1919, 56, 332—337. Chem. Zentr., 1920, 91, II., 511—512.

THE process depends on the fact that only absorbed light is chemically active, so that a colored enolic compound which is changed by light into a colorless keto compound is affected only by light complementary to its own color. The sensitive film, dark brown in color, consists of a mixture of three enolic substances, yellow, red, and blue; it bleaches right out in white light but leaves the corresponding color when acted on by colored light. Sensitizers may be added to the mixed colors, and the pictures may be fixed.

Manuscript, typewritten or printed matter, drawings, photographs or the like; Reproducing (photographically) ——. S. J. Waters, Esher. U.S. Pat. 1,327,931, 13.1.20. Appl., 9.11.18.

A STENCIL for the reproduction of manuscript, etc., is obtained by printing through the matter, or through a negative of it on to a thin sensitized film, transferring the film to a temporary support for development, etc., and then transferring it to a final backing of fine texture.

Photographic printing paper and process of making the same. T. P. Middleton, Assignor to Kerotype, Ltd., London. U.S. Pat. 1,329,918, 3.2.20. Appl., 24.4.19.

Non-inflammable films or filaments for kinematographic and other industrial purposes; Manufacture of ——. W. J. Stevenson, London. Eng. Pat. 138,379, 21.8.18. (Appl. 13,569/18.)

A NON-INFLAMMABLE, impermeable, durable, flexible, and transparent film is obtained from a solution of cellulose acetate, preferably in tetrachloroethane or benzyl alcohol, containing also triacetin and triphenyl phosphate; the amounts of the two latter are about equal and may vary from 10 per cent. to 30 per cent. of the weight of the cellulose acetate.

Colored photographs or kinematograph films; Producing ——. W. Finnigan, London, and R. A. Rodgers, Hove. Engl. Pat. 138,396, 7.1.19. (Appl. 420/19.)

A NEGATIVE is taken through a translucent colorless screen, such as ground glass, in contact with the sensitive film, and a print is obtained from this negative on a sensitized material provided with a colored dotted screen film between the base and the sensitive film.

Sensitizing with bichromate. R. Mamias. Il Progressio Fotog., 1915, 208. Bull. Soc. Franç. Phot., 1919, 6, 331—332.

CARBON-TISSUE paper sensitized with bichromate keeps for only a few days. If the normal salt or the normal salt with a small addition of alkali be used in place of the bichromate, the paper keeps almost indefinitely, but is too slightly sensitive for use. The combination of good keeping quality and high sensitiveness may be obtained by coating the paper with a mixture containing slightly alkaline chromate, and then treating it, just before use, for about half an hour in a closed box at ordinary temperature with the vapor of a volatile acid, such as acetic acid.

Wedge color-filter for distant photography. O. Will, Munich. Ger. Pat. 309,167, 28.8.17.

A COMPOSITE color-filter contains two or more wedge filters, cemented between glass; the different wedges may be of different colors and their slopes may be in the same or in opposite directions.

Colored cinematograph films; Process of producing ——, and apparatus therefor. L. F Douglass, San Rafael, Cal. U. S. Pat. 1,325,280, 16.12.19. Appl., 13.8.18.

In two-color cinematography, with alternating red and green taking screens, a portion of the green screen exposure is made through a blue screen, the proportion of blue screen exposure being increased with increase of the distance between the lens and the object.

Color Photography. D. F. Comstock, Brookline, Mass., and Technicolor Motion Picture Corporation, Boston, Mass., U.S.A. Eng. Pat. 132,580, 15.8.18. (Appl., 13.271/18.)

Photographic films; Hardening —— during development. J. H. Christensen, Sölleröd. E. P. 135,477, 14.11.19. (Appl. 28,287–19.) Conv., 20.11.18.

The hardening effect on the gelatin of developers containing, *e. g.*, pyrogallol, catechol, or quinol is considerably increased by the addition to the developer of substances which counteract the swelling of the gelatin, such as alcohol, carbonates, silicates, etc. The addition of a restrainer such as bromide or a borate is preferable in order to prolong the time of development. A film in relief is obtained from which the unexposed and unhardened parts may be washed with hot water, and which may be used for various printing processes, including color transfer processes.

Colored photographs or kinematograph films; Producing ——. W. Finnegan, London, and R. A. Rodgers, Hove. E. P. 140,349, 7.1.19. (Appl. 28,247–19.)

Two negatives are taken on two plates or films placed face to face, the upper one being an ordinary plate or film and the lower one panchromatic. From these negatives two positives are printed which are colored blue-green and pink-red respectively and combined in register.

Brown tone on development prints; Process for producing ——. C. Schleussner A.-G., Frankfort. G.P. 318,503, 10.8.18.

Light-fast brown tones are obtained by bleaching the developed print, before or after fixing, in a solution of mercuric chloride containing bromide and then treating it with a solution of sodium thiosulphate containing lead.

Gradation of photographic negatives and diapositives; Improvement of ——. J. Rieder, Berlin--Steglitz. G.P. 318,820, 5.4.19.

The picture is provided on the film side with a coating of asphalt, caoutchouc, or similar light-sensitive resin, exposed through the support, and the coating developed with alcohol or acetone, etc. The picture is then treated with an intensifying or reducing solution or with a dye solution, the action of such reagents being modified by the variable permeability to aqueous solutions produced by the top coating.

Pigment (carbon) prints to metal; Process for transfer of —— as etching resists for process blocks. Rotophot-A.-G. für graphische Industrie, Berlin. G.P. 318,687, 26.9.15.

A matt surface is produced on the metal by electrolytic action before transfer of the carbon print; this prevents the formation of blisters.

Photographic films; Production of —— in natural colors. R. Wellesley, Goodmayes, and T. M. Sanders, Sevenoaks. E.P. 140,560, 18.8.19. (Appl. 4053–19.)

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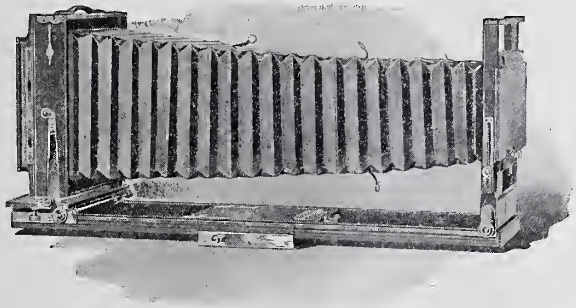

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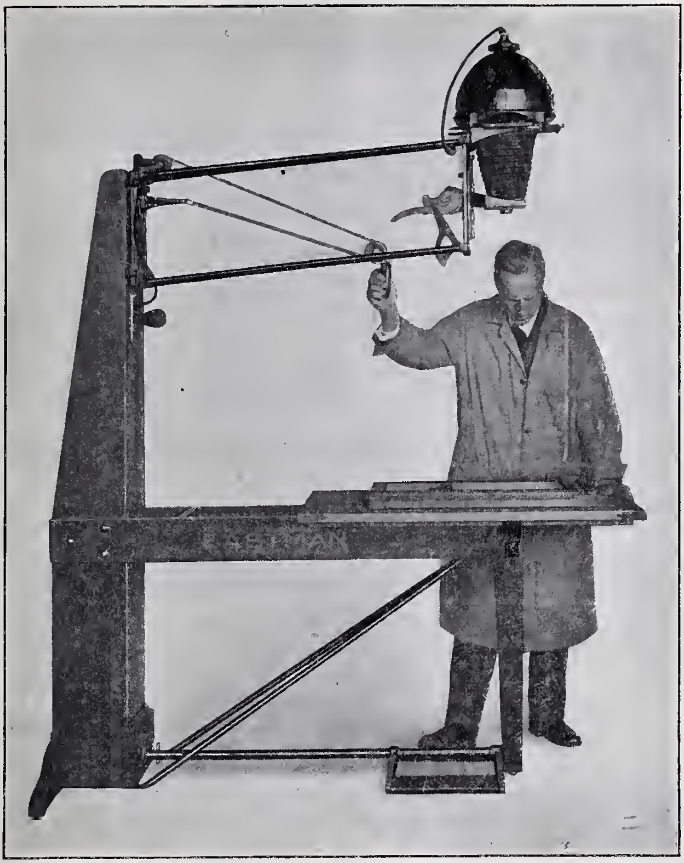

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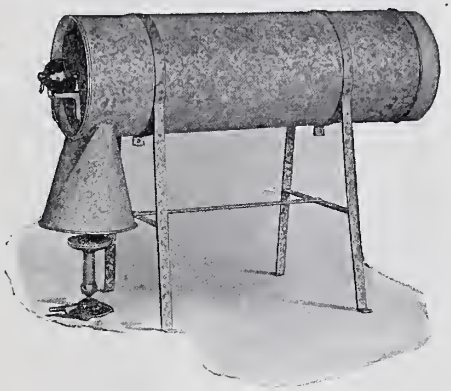

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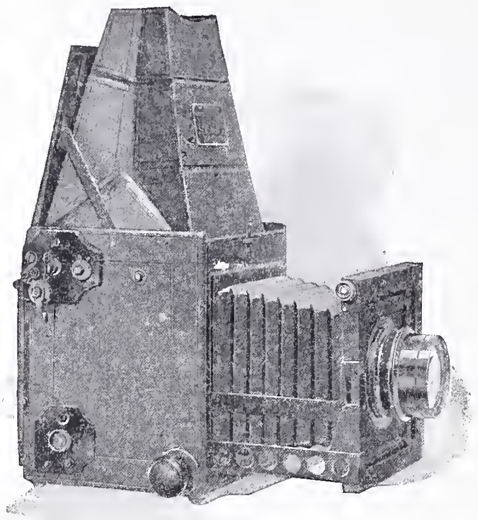

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